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# REVIEW AND INTERPRETATIONS OF ALTON PIPELINE ROUTE AREA KANE COUNTY, UTAH & MOHAVE COUNTY, ARIZONA



**USDA SOIL CONSERVATION SERVICE**

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SOIL SURVEY AND INTERPRETATIONS  
OF  
ALTON PIPELINE ROUTE AREA KANE COUNTY, UTAH &  
MOHAVE COUNTY, ARIZONA

BY  
Soil Conservation Service  
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## INTRODUCTION

This special report and interpretation covers lands in Kane County, Utah and Mohave County, Arizona. The report covers the area proposed for the route alternatives for the coal slurry pipeline between the Alton coal fields and St. George, Utah. There are approximately 110,985 acres in Kane County, Utah and 8,570 acres in Mohave County, Arizona. It was prepared in response to a request to the Soil Conservation Service by the Bureau of Land Management, Department of Interior.

The different kinds of soils identified in this report and on the maps are shown by symbols consisting of 2 or 3 letters or numbers. These symbols represent mapping units. In this report they will be referred to as mapping units. In this report they will be referred to as mapping unit AaB, KVH, Z6, etc. The description of each mapping unit describes the kind or kinds of soil that occur in that mapping unit. It includes slope, aspect and other landscape features.

Soils represented in this report do not occur as pure types. In addition to the soils described, there may be minor portions of different kinds of soils which are referred to as inclusions within mapping units. *Users should realize this information is a guide for planning land use and is not intended to replace onsite investigations.* However, this report contains information essential for planning and will help planners avoid unfavorable impacts.





# LOCATION MAP

Alton Pipeline Route Area Kane County, Utah & Mohave County, Arizona



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## HOW TO USE THIS REPORT

This report contains information on conditions affecting the use of land for dwellings, local roads and streets, septic tank absorption fields, recreation, etc. It also supplies information to assist in judging recreation uses and hydrologic soil groups.

The soils are shown on the map at the back of the report. Each soil is identified by a symbol and the pattern and extent shown by soil boundaries on the map. All areas having the same symbol are essentially the same kind of soil. Soil investigations are mostly to sixty (60) inches depth or inhibiting material.

The table of contents lists the mapping units in alphabetical sequence and gives the page numbers for the description of each unit. The land capability classification for each unit is given in the mapping unit description. The other interpretations are given in tabular form and placed immediately following each soil description.

To find information for a specified area, locate the area on the map; note the soil symbol. Turn to the table of contents and find the map unit name and the components of the mapping unit.

With the symbol and name you can locate the mapping unit description and the appropriate interpretations. The mapping unit description gives details pertinent to the various layers in the soil including texture, gravel and stone content, permeability and water capacity. The kind of vegetation, surface slope, wetness and other significant features are described. All of these factors are important in evaluating the engineering, hydrologic and other qualities of the soils.



## SOIL PROPERTIES AND INTERPRETATIONS FOR ENGINEERING

Following each mapping unit description is a table giving the properties and interpretations. It is divided into two main sections. (1) estimated engineering properties and (2) interpretations of soil-limitation ratings and dominant soil features affecting use.

### Estimated Engineering Properties

Some soil properties are of special interest to engineers because they affect construction, maintenance, and performance of roads, airports, pipelines, dams, building foundations, water storage facilities, erosion-control structures, sewage disposal systems, etc.

In using this information for engineering purposes, users must remember that soils do not occur as pure units. In each delineation there may be inclusions of other soils that classify and behave differently than the one rated. These data are for general planning. On-site studies are needed to get information for design so that any inclusions may be considered adequately.

A definition of information in each column of the table follows. If any item is not pertinent or information was unavailable for a given soil, it is not rated.

USDA Texture - This is determined by the relative proportions of sand, silt, and clay in soil material that is less than 2.0 millimeters in diameter. These and some of the other terms used in the USDA textural classification are defined in the glossary of this report. This system is used by the soil scientist in describing and identifying the soil.

Unified Classification System - In the Unified System, soils are identified according to their grain size distribution and plasticity and are grouped according to their performance as engineering construction material. Soil materials are classified as coarse grained which are gravels (G) and sands (S); fine grained, which are silty (M) and clay (C); and highly organic (O). In this system, clean gravel and sands are identified by the symbols GW, GP, SW and SP; gravels and sands with fines of silt and clay, by GM, GL, SM and SC; silts and clays with low liquid limit, by ML and CL; and silts and clays having high liquid limit, by MH and CH. Organic soils by OM and OH with peat as Pt.

AASHTO Classification System - The American Association of State Highway Officials System of classifying soils in an engineering property classification based on field performance of highways. It is the most widely known system used in highway practices. Under this system, grouping soils of about the same general load-carrying capacity and service characteristics resulted in seven basic groups that were designated A-1 through A-7. The best soils for road subgrades are classified as A-1, the poorest soils are classified as A-7.

Rock fragments greater than 3 inches - This refers to that portion of the entire soil that is composed of rock fragments that have an average diameter greater than 3 inches. The amount is expressed in percent by weight. It represents that part of the soil that is not included in the classification under the Unified and AASHO systems.

Sieve sizes refer to the number of wires per inch and data give the percent by weight of soil passing the #4, #10, #40 and #200 sieves in relation to the soil smaller than 3 inches.

Liquid Limit is the moisture content in which a soil passes from a plastic to a liquid state.

Plasticity Index - The plastic limit is the moisture content at which a soil changes from a semisolid to a plastic condition. The plastic index is the range in moisture content at which a soil material is plastic.

Soil Permeability is the quality of a soil that enables it to transmit air and water. The estimates are based on porosity, texture, structure and aggregate stability. To describe the rate of saturated flow, permeability downward in undisturbed soils, the following terms are used, expressed as inches per hour:

very slow-----	less than 0.06
slow-----	0.06 to 0.2
moderately slow-----	0.2 to 0.6
moderate-----	0.6 to 2.0
moderately rapid-----	2.0 to 6.0
rapid-----	6.0 to 20
very rapid-----	more than 20

Available water capacity is the amount of water retained in the soil available for plant growth after all free water has drained away. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount in the soil at the wilting point of most plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. It was determined by using colormetric indicators on a 1:5 soil/ water ratio. The pH value, and relative terms used to describe soil reaction are explained in the glossary.

Exchangeable Sodium Percentage is the percent of the total bases (cations) on the soil exchanged complex in a soil that is sodium (See Alkali in the Glossary).

Salinity refers to the amount of soluble salts in the soil. It is expressed as the electrical conductivity of the saturation extract, in mmhos per centimeter at 25 C. Salinity affects the suitability of a soil for plant growth, its stability when used as construction material, and its corrosiveness to metals and concrete.

Dispersion refers to the degree and ease which soil structure breaks down or slakes in water.

Shrink-Swell potential is an indication of the volume change to be expected of the soil material with changes in moisture content. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates hazards to the maintenance of structures constructed in, on, or with such material.

Water table is the highest part of a soil saturated with water.

Hydrologic Soil Groups: Grouping of soils to estimate runoff from rainfall.

- A. (Low runoff potential) Soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well to excessively drained sands or gravels. These soils have a high rate of water transmission.
- B. Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.
- C. Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.
- D. (High runoff potential) Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

In assessing the soil hydrologic characteristics for mapping units that are complexes, the hydrologic rating group of each major component should be considered to the extent it occurs within the mapping unit.

Potential frost action as used in engineering refers to the probable affects on structures resulting from the freezing of soil material and its subsequent thawing. These probable effects are important factors in selecting sites for highway and runways, and also are important in planning any structure that is to be supported or abutted by soil that freezes. The action not only pertains to the heaving of soil as freezing progresses, but also to the excessive wetting and loss of soil strength during thaw.

Settlement potential is an estimate of volume change that can be expected when soil material is wetted to an optimum for compaction and loaded with test load. Ratings are low, medium and high. Soils with medium and high ratings require onsite investigation to determine design specifications.

Erosion Factors - K Value Class This is a numerical expression of the potential erodibility of the soil on a graduated scale of .10 to .64 divided into 12 classes. The lower index is the less erodible soil and low erodibility 0.2 to 0.4 is moderate erodibility and more than 0.4 high erodibility. T factor in the high index is the highest erodible. Mainly soils with a K value class of .2 or less are considered an expression of permissible soil loss in tons per acre per year that will be prohibit a high level of crop productivity to be sustained economically and indefinitely.

Wind Erosion group is a grouping of soils according to their susceptibility to movement of the surface soil by wind. Group 1 is most erodible, Group 8 is least erodible.

Water Supplying Capacity is an expression of the amount of water a soil can supply for plant growth. It consists of the amount of water the soil will hold following snowmelt plus the amount of precipitation that falls between the time plants start to grow and the time they have used all the stored moisture in the soil.

Interpretations of soil-limitation ratings and dominant soil features affecting use.

Soil limitations are indicated by the ratings; slight, moderate, and severe. Slight means soil properties generally favorable for the rated use with limitations that are minor and easily overcome. Moderate means that some soil properties are unfavorable but can be overcome or modified by special planning, design or special maintenance. Severe means soil properties so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, intensive maintenance, or a combination of these.

Soils are also rated as to their suitability as a source of material. They are rated as Good, Fair, Poor and Unsuitable.

Following all ratings in the table except Slight or Good, are briefly listed the soil limitations that cause the soil to be rated lower than Slight or Good.

For a given use a soil may have some properties that cause a severe limitation and other properties that cause a moderate limitation.

The slope percentages that are shown in the mapping units cover the major part of the slope from the flattest to the steepest, as the soil occurs in the landscape. Since slope is a rating criteria and some soils cover a broad slope range, it sometimes covers from Slight to Severe limitations. Some on-site investigations may be necessary.

Criteria used for all the soil ratings except wildlife habitat are given in the guide sheets in the appendix. These have been developed by the Soil Conservation Service and are used widely as ratings criteria. By referring to the guide sheets and soil descriptions, one may see the reasons for the ratings.

However, this information does not eliminate the need for sampling and testing at the site of specific engineering works that involve heavy loads or where the excavations are deeper than the depth of layers here reported. Even in these situations, however, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Septic Tank Absorption fields are subsurface systems of tile or perforated pipe that distributes effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affected both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock and susceptibility to flooding, slope, erosion, lateral seepage, and down slope flow of effluent. Large rocks or boulders also affect the construction of septic tank absorption fields. (See Soil Limitation Ratings for Septic Tank Absorption Field, Effects of Slope on Septic Tank Absorption Fields, Planning Septic Tank Absorption Fields, and Permeability Classes Related to Water Volume in the Appendix).

Sewage Lagoons: A lagoon is a shallow lake used to hold sewage for the time required for bacterial decomposition. Enough soil material that is suitable for the structure must be available. When the lagoon is properly constructed it must be capable of holding water with minimum seepage. The soils having slight limitation include those that are effective in functioning as sealed basin floors and that are low in organic material. Those soils having moderate limitations are the ones that require special practices or treatment to modify limitation to their use as sites for sewage lagoons. The soils having severe limitation are those that are very porous or have other limitations that either make them unsuited or require intensive and usually expensive treatments to make them suitable as sites for sewage lagoons. (See Soil Limitation Ratings for Sewage Lagoons in the Appendix).

The Trench-Type Sanitary Landfill is a dug trench in which refuse is buried daily, or more frequently if necessary, the refuse is covered with a layer of soil material at least 6 inches thick. That material is the soil excavated in digging the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. Because trenches as deep as 15 feet or more are used for many

landfills, geologic investigation is needed to determine the potential for pollution of ground water as well as to ascertain the design needed. These investigations, generally arranged for by the landfill user, include examination of stratification, rock formations and the like that might leachates to aquifers, wells water courses, and other water sources. The presence of hard nonrippable bedrock, or creviced bedrock, or sandy or gravelly strata in or immediately under lying the proposed trench bottom is undesirable from the standpoints of excavation and potential pollution of underground water.

The size and character of landfills are such that it is not practical to remove refuse if a pollution problem should arise. Consequently thorough evaluation of site hydrology is essential before hand. (See Soil Limitation Ratings for Trench-Type Sanitary Landfills in the Appendix).

The Area Type Sanitary Landfill is an area where refuse is placed on the surface of the soil in successive layers. The daily and final cover material generally must be imported. A final cover of soil material at least 2 feet thick is placed over the fill when it is completed. The soil under the proposed site should be thoroughly investigated to determine the probability of leachates from the landfill penetrating the soil to the extent that water supplies are polluted. (See Soil Limitation Ratings for Area-Type Sanitary Landfills in the Appendix).

Cover Area Type Sanitary landfill is based on properties that reflect workability such as ease of digging, moving, and spreading over the refuse daily during both wet and dry periods. Slope, wetness, and thickness of the soil material are important considerations. In addition the borrow area must be reclaimable. (See Sutability Ratings of Cover Material. Area-type Sanitary Landfills in the Appendix).

Shallow Excavation: These excavations require excavating or trenching to depths of 5 or 6 feet. It should be noted that the limitation ratings for shallow excavations are relevant only to the problems encountered in the digging and not relevant for such uses as dwellings with basements, sanitary landfills, cemeteries, underground utilities, sewers, drains or other uses to which excavations might be put. (See Soil Limitation Ratings for Shallow Excavations in the Appendix).

Dwellings With and Without Basements: The emphasis in rating soils for dwellings is mainly for the properties that affect foundations but the effects of slope, susceptibility to flooding, seasonal wetness and other hydrologic conditions are also considered. The properties influencing foundation support are those affecting bearing capacity and settlement under load plus those influencing cost of excavation and construction. Bearing strength and settlement of the natural soil are affected by density, wetness, flooding, plasticity, texture, and shrink-swell potential. Properties affecting amount and ease of excavation are wetness, slope, depth to bedrock stoniness, and rockiness. It is important to

note that on-site investigations are for specific placement of buildings and utility lines. (See Soil Limitation Ratings for Dwellings in the Appendix).

Local Roads and Streets: Local roads and streets for which soil ratings are given have an all-weather surface expected to carry automobile traffic all year. These roads and streets have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface that is commonly asphalt or concrete. They are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet. (See Soil Limitations Local Roads and Streets in the Appendix),

Suitability as a Source of Roadfill: These ratings pertain to suitability of soils as a source of roadfill. The ratings, good, fair and poor reflect how well a soil will perform after it is removed from its original location and placed in a road embankment. Since soil survey interpretations are oriented to local roads and streets rather than to super highways, the assumption is that the suitability ratings are evaluations of the soils as a source of roadfill for low embankments, generally less than 6 feet high. However, soil surveys are useful to highway planners and others in pointing up possible problems and alternatives (See Suitability Ratings of Soils as Source of Roadfill in the Appendix).

Suitability as a Source of Sand and Gravel is given as a guide to potential local sources of these materials. It shows the various ratings based on the Unified Classification of the soil. Local observation indicates most soils having favorable ratings have underlying materials that extend considerably below the normal 60 inch depth of observation. (See Suitability Ratings of Soils as Source of Sand and Gravel in the Appendix).

Suitability as a Source of Topsoil: This rating gives guidance to engineers, landscapers, nurserymen, home owners, planners and others in making decisions about selecting stockpiling, and using topsoil. (See Suitability Ratings of Soils as Sources of Topsoil in the Appendix).

Recreation Uses: These ratings pertain to four main recreational uses of soils, camp areas, picnic areas, playgrounds, paths and trails.

Camp Areas; This interpretation rates soils to be used intensively for tents and camp trailers and the accompanying activities of outdoor living. (See Soil Limitations for Camp Areas in the Appendix).

Picnic Areas: This rating gives soil limitations for intensive park and picnic-type activities. (See Soil Limitations for Picnic Areas in the Appendix).

Playgrounds: Soil interpretations are made for areas receiving intensive foot traffic or organized games such as baseball, football or volleyball. (See Soil Limitations for Playgrounds in the Appendix).

Paths and Trails: Ratings are give for foot paths, cross country  
tails and for horeseback use. (See Soil Limitations for Paths and  
Trails in the Appendix):

## SOILS LEGEND

<u>Map Symbol</u>	<u>Mapping Unit Name</u>
AaB	As clay loam, 2 to 4 percent slopes.
AkB	Sa-La very fine sandy loams, 2 to 4 percent slopes
BaD	Ba very fine sandy loam, 4 to 15 percent slopes
BkF	Ka-Mb complex, 2 to 40 percent slopes
CaB	Ca cobbly very fine sandy loam, 0 to 4 percent slopes
DaA	Da fine sandy loam, 0 to 2 percent slopes
EaG	Ea fine sand, 15 to 40 percent slopes
Fa	Fluvaquents and Torrifluvents, sandy
GaA	Ga silty clay loam, 0 to 2 percent slopes
HaB	Ha silt loam, 0 to 4 percent slopes
JaC	Ja fine sandy loam, 2 to 8 percent slopes
KVH	Lithic Ustorthents - Lithic Haploborolls - Rock outcrop complex
MaD	Ma fine sand, 4 to 12 percent slopes
MbB	Mb fine sand, 2 to 4 percent slopes
McD	Mc fine sand, 2 to 10 percent slopes
MeD	Me sand, 2 to 10 percent slopes
MeF	Me sand-Rock outcrop complex, steep
MtF	Mt very stony loamy fine sand, 20 to 50 percent slopes
PaB	Pa fine sandy loam, 2 to 4 percent slopes
PbB	Pa loamy fine sand, 2 to 4 percent slopes
RbB	Rb fine sandy loam, 2 to 4 percent slopes

Map SymbolMapping Unit Name

RMF	Rock outcrop - Me complex, very steep
SbB	Sa loamy fine sand, 2 to 4 percent slopes
TbD	Tb sandy loam, 1 to 10 percent slopes
UJF	Typic Ustorthents, fine-loamy, mixed, (calcareous), frigid, steep
XJH	Typic Ustorthents, sandy-skeletal, mixed, (calcareous), mesic, shallow very steep
Z4	Tc - Cinder land complex, 40 to 60 percent slopes
Z6	Dune land
Z9	Lava flows

## DESCRIPTIONS OF THE SOILS

The mapping units are identified on the soils map by a series of three letters. The first two letters indicate the soils series involved and the third indicates slopes. Where the second letter is lower case, the mapping unit consists of a single soil phase-Example: AaB. Where the second letter is a capital letter, the mapping unit is composed of 2 to 3 soil phases in a complex-Example: KVH. However, composition of the unit was controlled to permit interpretations for expected uses. A letter and a number combined indicates a miscellaneous land type - Example: Z6 is Dune land. The third letter in the mapping symbol represents the slope group.

The soils of one series can differ in texture of the surface layer (6 to 8 inches) in slope, stoniness, or some other characteristic that affects the use of the soil. On the basis of these differences the series are divided into phases. Generally the name of the phase indicates the dominant feature that affects its use. Descriptions of each mapping unit in this section are in alphabetical order by map symbol.

Letters are used as names for these soils because they have not been correlated as series into the national system of soil classification. Hence the information in this report is tentative and subject to revision, and the soils will be named when the remainder of the area is surveyed and published.

AaB    Aa clay loam, 2 to 4 percent slopes

This soil is very deep and well drained. It occurs on alluvial fans and in valleys at elevations of 6,200 to 6,700 feet. This soil formed in alluvium derived mainly from Tropic shale. Average annual precipitation is 14 to 17 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 120 to 140 days. Slopes range from 2 to 4 percent. Native vegetation is squirreltail, galleta, western wheatgrass, tall native bluegrass, phlox and big sagebrush.

This soil occurs mainly in the Upper Kanab drainage and in the Black Knoll area.

Included with this soil in mapping are small areas of Da fine sandy loam, 0 to 2 percent slopes; small areas of a shallow clay loam soil over basalt. Also included are small areas where a loamy fine sand overwash occurs on the surface.

In a typical profile the surface layer is grayish brown clay loam about 4 inches thick. The subsoil is dark grayish brown or grayish brown clay loam or light clay about 45 inches thick. The substratum is grayish brown and pale brown sandy clay loam and sandy loam to a depth of 60 inches or more.

Permeability is slow. Available water capacity is 9 to 12 inches to a depth of 5 feet. Organic matter content in the surface layer is low, about 2 percent. Effective rooting depth is 60 inches or more, but presently most roots are in the upper 35 inches. Surface runoff is slow and the erosion hazard is slight under potential native vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The soil erodibility factor "K" value class, is .24 in the surface 8 inches and .32 below 8 inches. The Soil Surface Factor (SSF) is 37.

This soil is used for rangeland and wildlife habitat.

A representative profile of Aa clay loam, 2 to 4 percent slopes, in the NE 1/4 of the NW 1/4 of section 28, T. 40 S., R. 5 W. in a rangeland area follows:

A1--0 to 4 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate, fine granular structure; hard, firm, slightly sticky, plastic; few very fine, fine and medium roots; many very fine and fine and few medium pores; noncalcareous; neutral (pH 7.0); abrupt smooth boundary.

B1--4 to 8 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) when moist; weak, medium prismatic structure that parts to moderate medium subangular blocky; very hard, firm, sticky, very plastic; few, very fine, fine and medium roots; few, very fine and fine pores; noncalcareous; neutral (pH 7.2); clear smooth boundary.

B2lt--8 to 17 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate, medium prismatic structure that parts to strong medium angular blocky; very hard, very firm, sticky, very plastic; few, very fine, fine and medium roots; few, very fine and fine pores; few, thin clay films in pores; noncalcareous; mildly alkaline (pH 7.7); clear smooth boundary.

B22t--17 to 35 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) when moist; moderate, medium prismatic structure that parts to strongly medium angular blocky; extremely hard, very firm, sticky, very plastic; few very fine and fine roots; few very fine and fine pores; few thin clay films in pores; moderately calcareous, lime is disseminated; moderately alkaline (pH 8.1); gradual smooth boundary.

B3ca--35 to 49 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) when moist; weak, medium prismatic structure that parts to strong medium subangular blocky; extremely hard, very firm, sticky, very plastic; few very fine and fine roots; few fine and medium pores; moderately calcareous, lime is in soft nodules; moderately alkaline (pH 8.3) gradual smooth boundary.

C1ca--49 to 65 inches; grayish brown (10YR 5/2) sandy clay loam, brown (10YR 4/3) when moist; strong medium subangular blocky structure; very hard, firm, sticky plastic; few, very fine and fine roots; few, fine and medium pores; moderately calcareous, lime is in soft nodules; moderately alkaline (pH 8.4); gradual, smooth boundary.

C2--65 to 84 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; strong, medium subangular blocky structure; hard, friable slightly sticky, slightly plastic; moderately calcareous, lime is in soft nodules; strongly alkaline (pH 8.5).

The A1 horizon has hue of 10YR or 2.5Y, value of 4 or 5 dry and 3 moist, and chroma of 2 or 3. It is dominantly clay loam, but is marginal to silty clay loam in some places. The A1 horizon is 4 to 13 inches thick. The B2t horizon has hue of 10YR or 2.5Y, value of 4 or 5 dry and 3 or 4 moist and chroma of 2 or 3. It is dominantly clay loam, but ranges to light clay in some layers in places. The upper part of the B2t horizon is noncalcareous or slightly calcareous and the lower part is slightly calcareous to strongly calcareous.

Soil suitability for range seeding is good. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 17 inches precipitation can be used. Equipment limitations are slight.





AaB Landscape View of Aa clay loam, 2 to 4 percent slopes. The vegetation is dominantly big sagebrush, squirrel-tail, galleta, western wheatgrass and tall native blue-grass.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Aa clay loam (AaB)  
 STATE UTAH RECORD NO.        AUTHOR(S) DAL. VLM DATE 4/77 REVISED    UNIT MODIFIER         
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE Aa SERIES ARE VERY DEEP, WELL DRAINED SOILS FORMED IN ALLUVIUM DERIVED FROM TROPIC SHALE, ON NEARLY LEVEL ALLUVIAL VALLEYS UNDER BIG SAGEBRUSH AND GALLETIA AT ELEVATIONS OF 6,200 TO 6,700 FEET. THE MEAN ANNUAL AIR TEMPERATURE IS 43 TO 45°F. AAR IS 14 TO 17 INCHES AND FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A GRAYISH BROWN CLAY LOAM SURFACE LAYER 8 INCHES THICK. THE SUBSOIL IS DARK GRAYISH BROWN OR GRAYISH BROWN CLAY LOAM 41 INCHES THICK. THE SUBSTRATUM IS PALE BROWN SANDY CLAY LOAM TO 60 INCHES. SLOPES ARE 2 TO 4 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
A 0-8	CL	CL, CL-ML	A-4, A-6	0	100	100	95-100	70-95	20-35	5-15				
8-60	CL, SCL, C	CL	A-6, A-7	0	100	100	90-100	60-85	25-45	10-20				
DEPTH (IN)	CLAY PCT OF <2MM	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	30-35	1.6-1.8	0.06-.2	0.17-0.20	6.6-7.3	<2	Moderate	.24	5	6	1-3	High	High	
	25-35	1.7-1.9	0.06-.2	0.17-0.20	6.6-9.0	<2	Moderate	.32						
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			>6.0			-		>60		-			C	Moderate

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SEVERE - PERCS SLOWLY			FILL	191	ROADFILL		FAIR - LOW STRENGTH, SHRINK-SWELL	
					2				
					3				
					4				
					5				
SEWAGE LAGOONS	MODERATE - SLOPE			SAND	201	SAND		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)	MODERATE - TOO CLAYEY			GRAVEL	211	GRAVEL		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)	SLIGHT			SOIL	221	TOPSOIL		FAIR - TOO CLAYEY	
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL	FAIR - TOO CLAYEY			PONDERS	231	POND RESERVOIR AREA		FAVORABLE	
					2				
					3				
					4				
					5				
SHALLOW EXCAVATIONS	MODERATE - TOO CLAYEY			DIKES	241	EMBANKMENTS DIKES AND LEVEES		PIPING	
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS	MODERATE - SHRINK-SWELL, LOW STRENGTH			PONDAQ	251	EXCAVATED PONDS AQUIFER FED		NO WATER	
					2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS	MODERATE - SHRINK-SWELL, LOW STRENGTH			DRAIN	261	DRAINAGE		NOT NEEDED	
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS	MODERATE - SHRINK-SWELL, LOW STRENGTH			IRRIG	271	IRRIGATION		PERCS SLOWLY, SLOPE	
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS	MODERATE - SHRINK-SWELL, FROST ACTION, LOW STRENGTH			TERRAC	281	TERPACES AND DIVERSIONS		PERCS SLOWLY, SLOPE, PIPING	
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRASSSED WATERWAYS		PERCS SLOWLY, SLOPE	
					2				
					3				
					4				
					5				

FOOTNOTES	REGIONAL INTERPRETATIONS



AkB     Sa-La very fine sandy loams, 2 to 4 percent slopes

This mapping unit is a complex consisting of about 55 percent Sa very fine sandy loam, 2 to 4 percent slopes, about 35 percent La very fine sandy loam, 2 to 4 percent slopes and 10 percent other soils. This complex occurs on mesas at elevations of 6,400 to 7,000 feet. The Sa soil is on slightly raised rolling ridges and the La soil occurs in lower lying areas between ridges. Natural vegetation is dominantly blue grama, western wheatgrass, globemallow, big sagebrush, serviceberry, bitterbrush and scattered juniper. The average annual precipitation ranges from 14 to 17 inches. Mean annual air temperature is 44° to 45°F. and the frost-free season is 120 to 140 days.

This complex occurs mainly on the southern part of Glendale Bench.

Included within this mapping unit are small areas of Ja fine sandy loam, 2 to 8 percent slopes; small areas of Ba very fine sandy loam, 4 to 15 percent slopes; small areas of Mb fine sand, 2 to 4 percent slopes and small areas of a shallow soil over limestone.

The Sa very fine sandy loam, 2 to 4 percent slopes is deep and well drained. It formed in material weathered from sandstone and limestone of the Carmel formation.

In a typical profile the surface layer is brown and dark brown, very fine sandy loam and fine sandy loam about 18 inches thick. The subsoil is yellowish red heavy fine sandy loam underlain by limestone bedrock at depths of about 47 inches.

Permeability is moderate. Available water capacity is 5.5 to 7.5 inches to a depth of 40 to 60 inches. Organic matter content in the surface layer is slow, about 1 percent. Effective rooting depth is 40 to 60 inches or more, but most roots are in the upper 30 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor, "K" value class is .28 in the upper 18 inches and .20 below 18 inches. The Soil Surface Factor (SSF) is 25.

A representative profile of Sa very fine sandy loam, 2 to 4 percent slopes, about 2,500 feet north and 2,400 feet west of the southwest corner of section 27, T. 41 S., R. 7 W. in a rangeland area follows:

A11--0 to 4 inches; brown (10YR 5/3) very fine sandy loam, dark brown (7.5YR 3/3) when moist; single grain; loose, nonsticky, nonplastic; many very fine, few fine and medium roots; mildly alkaline (pH 7.5); abrupt, smooth boundary.

A12--4 to 11 inches; brown and dark brown (10YR 4/3) very fine sandy loam, dark brown (7.5YR 3/2) when moist; weak, medium subangular blocky structure that parts to weak fine granular; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; few fine, few medium pores; mildly alkaline (pH 7.7); clear, smooth boundary.

A3--11 to 18 inches; brown and dark brown (7.5YR 4/4) very fine sandy loam, dark brown (7.5YR 3/2) when moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine, fine and medium roots; few fine and medium pores; mildly alkaline (pH 7.6); gradual, smooth boundary.

B1--18 to 31 inches; (7.5YR 5/4) very fine sandy loam, reddish brown (5YR 4/4) when moist; moderate medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few very fine, fine and medium roots; common very fine, few fine and medium pores; extensively worked by cicada; mildly alkaline (pH 7.5); gradual, smooth boundary.

B21t--31 to 41 inches; yellowish red (5YR 5/6) heavy fine sandy loam, reddish brown (5YR 4/4) when moist; strong, medium, subangular blocky structure; very hard, firm, sticky, slightly plastic; few very fine and fine roots; few very fine pores; few thin clay films on faces of peds; extensively worked by cicada; mildly alkaline (pH 7.4); gradual, wavy boundary.

B22t--41 to 47 inches; yellowish red (5YR 4/6) flaggy heavy fine sandy loam, reddish brown (5YR 4/4) when moist; strong medium subangular blocky structure; very hard, firm, sticky, slightly plastic; few very fine and fine roots; few very fine pores; few thin continuous clay films on faces of peds; extensively worked by cicada, 50 percent limestone fragments; mildly alkaline (pH 7.4); abrupt, smooth boundary.

R--47 inches; limestone bedrock.

The A1 horizon has hue of 10YR or 7.5YR, value of 4 or 5 dry and 3 moist. It is very fine sandy loam or fine sandy loam that is marginal to loamy fine sand. The A1 horizon is 10 to 20 inches thick. The B2t horizon is heavy fine sandy loam or light sandy clay loam. Depth to limestone bedrock is 40 to more than 72 inches.

The La very fine sandy loam, 2 to 4 percent slopes soil is moderately deep and well drained. It formed in residuum from sandstone and limestone.

In a typical profile the surface layer is brown and dark brown very fine sandy loam about 10 inches thick. The subsoil is yellowish red heavy very fine sandy loam and sandy clay loam over limestone bedrock at depths of about 35 inches.

Permeability is moderate. Available water capacity is 3.5 to 6.0 inches above the bedrock. Organic matter content in the surface layer is low, about 1.5 percent. Effective rooting depth is 24 to 40 inches, but most roots are in the upper 20 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .20. The Soil Surface Factor (SSF) is 25.

A representative profile of La very fine sandy loam, 2 to 4 percent slopes about 2,000 feet north and 2,000 feet west of the southwest corner of section 27, T. 41 S., R. 7 W. in a rangeland area follows:

A11--0 to 3 inches; brown (7.5YR 5/2) very fine sandy loam, dark brown (7.5YR 3/2) when moist; single grain; loose, very friable, non-sticky, nonplastic; many very fine common fine and few medium roots; neutral (pH 7.2); abrupt smooth boundary.

A12--3 to 10 inches; brown or dark brown (7.5YR 4/2) very fine sandy loam, dark brown (7.5YR 3/2) when moist; weak, medium subangular blocky structure that parts to weak medium granular; soft, very friable, non-sticky, nonplastic; common very fine and fine, few medium roots; few very fine, fine and medium pores; neutral (pH 7.3); clear smooth boundary.

B21t--10 to 18 inches; yellowish red (5YR 4/6) very fine sandy loam, reddish brown (5YR 4/4) when moist; moderate, medium prismatic structure that parts to strong medium subangular blocky, hard, firm, slightly sticky, slightly plastic; few very fine, fine and medium roots; common very fine and fine pores; few thin continuous clay films on faces of peds; extensively worked by cicada; neutral (pH 7.3); gradual, smooth boundary.

B22t--18 to 29 inches; yellowish red (5YR 4/6) sandy clay loam, (5YR 4/4) moist; moderate, medium subangular blocky structure; hard, firm, slightly sticky, plastic; few very fine, few fine roots; few very fine and fine pores; few thin continuous clay films on faces of peds; extensively worked by cicada; neutral (pH 7.3); gradual smooth boundary.

B23t--29 to 35 inches; yellowish red (5YR 4/6) flaggy sandy clay loam, reddish brown (5YR 4/4) strong medium subangular blocky structure; hard, firm, slightly sticky, plastic; few very fine and fine roots; few very fine, fine and medium pores; few thin continuous clay films on faces of peds; 35 percent limestone fragments; mildly alkaline (pH 7.4) clear smooth boundary.

R--35 inches; limestone bedrock

The A1 horizon has hue of 10YR or 7.5YR, value of 4 or 5 dry and 2 or 3 moist. It is very fine sandy loam, marginal to loamy fine sand or fine sandy loam. The A1 horizon is 10 to 20 inches thick. The B2t horizon texture is heavy very fine sandy loam, heavy fine sandy loam or sandy clay loam. Depth to limestone bedrock is 24 to 40 inches.

The soils in this complex are used for rangeland and wildlife habitat.

Soil suitability for range seeding is good for the Sa soil and fair for the La soil. The limiting soil feature of the La soil is depth to bedrock and moderately low water holding capacity. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 17 inches precipitation can be used. Equipment limitations are slight.



AkB Landscape view of mapping unit AkB Sa-La very fine sandy loams, 2 to 4 percent slopes on the southern end of Glendale Bench. The vegetation is dominantly big sagebrush, blue grama, western wheatgrass, globemallow, bitterbrush and scattered juniper.

## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME La very fine sandy loam (AKB)  
 STATE UTAH RECORD NO.        AUTHOR(S) DAL-VLM DATE 4/77 REVISED    UNIT MODIFIER         
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE La SERIES ARE MODERATELY DEEP, WELL DRAINED SOILS FORMED IN RESIDUUM FROM SANDSTONE ON GENTLY SLOPING, UNDULATING TERRACES, UNDER NEEDLEANDTHREAD, NEVADA BLUEGRASS, ASTER AND BIG SAGEBRUSH, MAAT IS 44 TO 45 F. AAP IS 14 TO 17 INCHES. FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A BROWN VERY SANDY LOAM, ABOUT 10 INCHES THICK. THE SUBSOIL IS YELLOWISH RED FINE SANDY LOAM AND SANDY CLAY LOAM ABOUT 25 INCHES THICK OVER LIMESTONE BEDROCK. SLOPES ARE 2 TO 4 PERCENT

FOOTNOTE		ESTIMATED SOIL PROPERTIES									
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX	
					4	10	40	200			
0-10	VFSL	ML, SM	A-2, A-4	0	100	100	80-90	30-60	20-25	NP-5	
10-29	VFSL, SCL, FSL	SM, SM-SC	A-4	0	100	100	70-80	35-50	20-30	NP-10	
29-35	FSL, SCL, VFSL	SM, SM-SC	A-2, A-4	25-40	85-95	80-90	60-70	30-45	20-35	NP-10	
35	UWB										

DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND ERO. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
5-10	5-10	1.5-1.6	2.0-6.0	0.14-0.16	6.6-7.3	<2	Low	.20	3	3	1-2	HIGH	MODERATE
15-18	15-18	1.5-1.6	0.6-2.0	0.13-0.18	6.6-7.3	<2	Low	.17					
15-18	15-18	1.6-1.7	0.6-2.0	0.13-0.13	7.4-7.8	<2	Low	.15					

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6.0					24-40	HARD	-		B	MODERATE

FOOTNOTES			SANITARY FACILITIES			KEYING ONLY			FOOTNOTES			CONSTRUCTION MATERIAL		
SEPTIC TANK ABSORPTION FIELDS	SEVERE: DEPTH TO ROCK				FILL	191			ROADFILL	POOR: THIN LAYER, AREA RECLAIM				
						2								
						3								
						4								
						5								
SEWAGE LAGOONS	SEVERE: DEPTH TO ROCK				SAND	201			SAND	UNSUITED:				
						2								
						3								
						4								
						5								
SANITARY LANDFILL (TRENCH)	SEVERE: DEPTH TO ROCK				GRAVEL	211			GRAVEL	UNSUITED:				
						2								
						3								
						4								
						5								
SANITARY LANDFILL (AREA)	SLIGHT:				SOIL	221			TOPSOIL	FAIR: AREA RECLAIM				
						2								
						3								
						4								
						5								
DAILY COVER FOR LANDFILL	POOR: THIN LAYER, DEPTH TO ROCK, AREA RECLAIM				PONORS	231			POND RESERVOIR AREA	SEEPAGE: DEPTH TO ROCK				
						2								
						3								
						4								
						5								
SHALLOW EXCAVATIONS	SEVERE: DEPTH TO ROCK				DIKES	241			EMBANKMENTS DIKES AND LEVEES	THIN LAYER, SEEPAGE				
						2								
						3								
						4								
						5								
DWELLINGS WITHOUT BASEMENTS	MODERATE: DEPTH TO ROCK				POND/AG	251			EXCAVATED PONDS AQUIFER FED	NO WATER				
						2								
						3								
						4								
						5								
DWELLINGS WITH BASEMENTS	SEVERE: DEPTH TO ROCK				DRAIN	261			DRAINAGE	NOT NEEDED				
						2								
						3								
						4								
						5								
SMALL COMMERCIAL BUILDINGS	MODERATE - DEPTH TO ROCK				IRRIG	271			IRRIGATION	ROOTING DEPTH, SOIL BLOWING				
						2								
						3								
						4								
						5								
LOCAL ROADS AND STREETS	MODERATE: DEPTH TO ROCK, FROST ACTION				TERRAC	281			TERRACES AND DIVERSIONS	SLOPE: DEPTH TO ROCK				
						2								
						3								
						4								
						5								
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS					WATERW				DRAINAGE WATERWAYS	DEPTH TO ROCK, SLOPE				
						2								
						3								
						4								
						5								

FOOTNOTES		REGIONAL INTERPRETATIONS	

[illegible]

## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Sa very fine sandy loam, (Akb)  
 STATE UTAH RECORD NO.  AUTHOR(S) VLM-DAL DATE 4-77 REVISED  UNIT MODIFIER   
 CLASSIFICATION AND DESCRIPTION

THE Sa SERIES ARE DEEP, WELL DRAINED SOILS FORMED IN RESIDUUM FROM SANDSTONE ON GENTLY SLOPING UNDULATING TERRACES UNDER NEEDLE AND THREAD, NEVADA BLUEGRASS, ASTER AND BIG SAGEBRUSH. MAAT IS 44 TO 45 F. AAP IS 14 TO 17 INCHES. FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A BROWN AND DARK BROWN VERY FINE SANDY LOAM SURFACE LAYER 18 INCHES THICK. THE SUBSOIL IS YELLOWISH RED FINE SANDY LOAM TO 47 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.

## ESTIMATED SOIL PROPERTIES

ESTIMATED SOIL PROPERTIES													
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX			
					4	10	40	200					
0-18	VFSL	SM, ML	A-2, A-4	0	100	100	90-100	25-55	20-25	NP-5			
18-47	FSL, VFSL	SM, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-55	20-30	NP-10			
47+	UWB	SM-SC											
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
SAME DEPTH AS ABOVE	8-12	1.4-1.6	0.6-2.0	0.15-0.16	7.4-7.8	<2	LOW	.23	4	3	1-2	HIGH	MODERATE
	10-18	1.6-1.8	0.6-2.0	0.14-0.17	7.4-7.8	<2	LOW	.20					
	47+												

FLOODING			HIGH WATER TABLE			CEMENTED MAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6			-		40-72	HARD	-	-	B	MODERATE

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	A	MODERATE: DEPTH TO ROCK		FILL	191	ROADFILL		FAIR: LOW STRENGTH, THIN LAYER	
					2				
					3				
					4				
					5				
SEWAGE LAGOONS		MODERATE: SEEPAGE, DEPTH TO ROCK, SLOPE		SAND	201	SAND		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)		SEVERE: DEPTH TO ROCK		GRAVEL	211	GRAVEL		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)		SLIGHT		SOIL	221	TOPSOIL		GOOD	
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL		FAIR: DEPTH TO ROCK		PONDERS	231	POND RESERVOIR AREA		SEEPAGE: DEPTH TO ROCK	
					2				
					3				
					4				
					5				
FOOTNOTES		BUILDING SITE DEVELOPMENT				FOOTNOTES		WATER MANAGEMENT	
SHALLOW EXCAVATIONS		MODERATE: DEPTH TO ROCK		DIKES	241	EMBANKMENTS DIKES AND LEVEES		PIPING	
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS		SLIGHT		PONDAQ	251	EXCAVATED PONDS AQUIFER FEED		NO WATER	
					2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS		MODERATE: DEPTH TO ROCK		DRAIN	261	DRAINAGE		NOT NEEDED	
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS		SLIGHT		IRRIG	271	IRRIGATION		SLOPE	
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS		MODERATE: LOW STRENGTH, FROST ACTION		TERPAC	281	TERPACES AND DIVERGIONS		SOIL BLOWING, SLOPE	
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRASSSED WATERWAYS		SLOPE	
					2				
					3				
					4				
					5				

FOOTNOTES		REGIONAL INTERPRETATIONS	

UNIT NAME: Sa RECREATIONAL DEVELOPMENT  
UNIT MODIFIER:

UNIT MODIFIER		KEEPING ONLY		UNIT MODIFIER	
CAMP AREAS	FOOTNOTE	SLIGHT:	PLAYGD	321	FOOTNOTE
				2	SLOPE
				3	
				4	
				5	
PICKUP AREAS	FOOTNOTE	SLIGHT	PATHS	331	FOOTNOTE
				2	
				3	
				4	
				5	

## CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

[illegible]

WOODLAND SUITABILITY

[illegible]

WINDBREAKS

[illegible]

## WILDLIFE HABITAT SUITABILITY

[illegible]

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND) OR FOREST UNDERSTORY VEGETATION

COMMON PLANT NAME	PLANT SYMBOL (NLSN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE			
		ALL			
BLUEBUNCH WHEATGRASS	AGSP	8			
NEEDLEANDTHREAD	STC04	15			
NEVADA BLUEGRASS	PONE3	12			
PRAIRIE JUNEGRASS	KOCR	10			
WESTERN WHEATGRASS	AGSM	10			
OTHER PERENNIAL GRASSES	PPGG	15			
AMERICAN VETCH	VIAM	1			
ASPEN PEAVINE	LAL2	1			
ASTER	ASTER	2			
CURLY DOCK	RUCR	1			
DOUGLAS KNOTWEED	POD04	2			
OTHER PERENNIAL FORBS	PPFF	13			
BIG SAGEBRUSH	ARTR2	4			
BLACK SAGEBRUSH	ARARN	2			
OTHER SHRUBS	SSSS	4			
POTENTIAL PRODUCTION (LBS. AC. DRY WT)					
FAVORABLE YEARS		1600			
NORMAL YEARS					
UNFAVORABLE YEARS		825			

## FOOTNOTES

ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH

BaD     Ba very fine sandy loam, 4 to 15 percent slopes

This soil is very deep and well drained. It occurs on rolling terraces at elevations of 6,100 to 6,900 feet. This soil formed in residuum from sandstone and limestone. Average annual precipitation is 14 to 17 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 120 to 140 days. Slopes range from 4 to 15 percent. Natural vegetation is blue grama, Indian ricegrass, penstemon, globemallow, gambel oak, birchleaf mountain mahogany, bitterbrush, big sagebrush, Utah juniper, and pinyon pine.

This soil occurs mainly on the Glendale Bench area..

Included with this soil in mapping are small areas of Ja fine sandy loam, 2 to 8 percent slopes; small areas of La very fine sandy loam, 2 to 4 percent slopes and small areas of Sa very fine sandy loam, 2 to 4 percent slopes. Also included are areas of gypsum Rock outcrop and areas of very gravelly and very cobbly sandy loam soils with scattered stones. These areas occur as ridges capped with pediment gravels, that are deposits of stream channels of an earlier pediment surface.

In a typical profile the surface layer is brown, very fine sandy loam and loamy very fine sand about 12 inches thick. The subsoil is reddish brown, sandy clay loam about 70 inches thick. The substratum is reddish brown, fine sandy loam and loamy fine sand to a depth of 96 inches or more.

Permeability is moderate. Available water capacity is 7.5 to 9.0 inches to a depth of 5 feet or more. Organic matter content in the surface layer is low, about 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 40 inches. Surface runoff is medium and the erosion hazard is moderate under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. The Soil Erodibility Factor "K" value class is .20 in the upper 12 inches and .17 below 12 inches. The Soil Surface Factor (SSF) is 50.

This soil is used for rangeland and wildlife habitat.

A representative profile of Ba very fine sandy loam, 4 to 15 percent slopes, in the SW 1/4 of the NW 1/4 of section 29, T. 40 S., R. 6 W. in a rangeland area follows:

A11--0 to 2 inches; brown (10YR 4/3) loamy very fine sand, dark brown (10YR 3/2) when moist; weak, fine granular structure; soft, very friable, nonsticky, nonplastic; common, very fine and few fine roots; few very fine and fine pores; neutral (pH 7.1); abrupt smooth boundary.

A12--2 to 12 inches; brown (7.5YR 4/2) very fine sandy loam, very dark brown (7.5YR 3/2) when moist; weak, medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and medium, common fine roots; common very fine and fine, few medium pores; neutral (pH 7.0); clear, smooth boundary.

B1--12 to 17 inches; reddish brown (5YR 4/4) fine sandy loam, dark reddish brown (5YR 3/3) when moist; weak, medium prismatic structure that parts to moderate medium subangular blocky; slightly hard, friable, nonsticky, slightly plastic; few, very fine, fine and medium roots; few fine and medium pores; neutral (pH 6.8); clear wavy boundary.

B21t--17 to 33 inches; reddish brown (5YR 4/3) sandy clay loam, reddish brown (5YR 4/3) when moist; strong, medium prismatic structure that parts to strong medium subangular blocky; very hard, firm, sticky, plastic; few very fine, fine and medium and common coarse roots; few very fine, fine and medium pores; few, thin clay films in pores and on faces of peds; slightly acid (pH 6.5); gradual smooth boundary.

B22t--33 to 58 inches; reddish brown (5YR 5/4) fine sandy loam, reddish brown (5YR 4/4) when moist; moderate, medium prismatic structure that parts to strong medium subangular blocky structure; hard, firm, sticky, plastic; few, very fine, fine and medium roots; few, very fine and fine pores; common thin clay films in pores and on peds; neutral (pH 6.7); gradual smooth boundary.

B3--58 to 83 inches; reddish brown (5YR 4/4) fine sandy loam, reddish brown (5YR 4/4) when moist; weak, medium prismatic structure that parts to moderate medium subangular blocky; hard, friable, sticky, slightly plastic; few very fine and fine pores; few, thin clay films in pores; slightly calcareous, lime is disseminated; moderately alkaline (pH 8.1); gradual smooth boundary.

C1--83 to 96 inches; reddish brown (5YR 4/4) loamy fine sand, reddish brown (5YR 4/4) when moist; massive; slightly hard, friable, nonsticky, nonplastic; slightly calcareous, lime is disseminated; mildly alkaline (pH 7.8).

The A1 horizon has hue of 10YR, 7.5YR or 5YR, value of 2 through 5 dry, 2 or 3 moist, and chroma of 2 or 3. It is dominantly fine sandy loam, but includes thin layers of loamy fine sand. The A1 horizon is 10 to 16 inches thick. The B2t horizon has hue of 5YR, value of 4 or 5 dry, 3 or 4 moist and chroma of 3 through 6. It is sandy clay loam or heavy fine sandy loam. Structure is weak to strong, medium prismatic. Clay films are few to common, thin to moderately thick in pores and faces of some peds.

Soil suitability for range seeding is good. Plant species generally recommended for seeding are intermediate wheatgrass, Topar Pubescent wheatgrass, Luna Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 17 inches precipitation can be used. Equipment limitations are slight.

## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Ba very fine sandy loam (BaD)  
 STATE UTAH RECORD NO.        AUTHOR(S) DAL-VLM DATE 4/77 REVISED    UNIT MODIFIER         
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE Ba-SERIES ARE VERY DEEP WELL DRAINED SOILS, FORMED IN RESIDUUM FROM SANDSTONE ON ROLLING TERRACES UNDER JUNIPER, PINYON, BIG SAGEBRUSH AND OAK AT ELEVATIONS OF 6,100 TO 6,900 FEET. MAAT IS 43 TO 45 F. AAP IS 14 TO 17 INCHES AND FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A BROWN VERY FINE SANDY LOAM SURFACE LAYER 12 INCHES THICK. THE SUBSOIL IS REDDISH BROWN SANDY CLAY LOAM 46 INCHES THICK. THE SUBSTRATUM IS BROWN FINE SANDY LOAM TO A DEPTH OF 60 INCHES OR MORE. SLOPES ARE 4 TO 15 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USOA TEXTURE	UNIFIED	AASHO	FRACT. 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
A 0-12	VFSL, LVFS	SM, SM-SC	A-4	0	100	100	70-85	40-50	20-25	NP-10				
12-58	SCL, FSL	CL, SC, CL-ML, SM-SC	A-6, A-4	0	100	100	75-90	40-60	30-40	5-15				
58-96	FSL, LFS	SM, SM-SC	A-4	0	100	100	70-85	35-50	20-30	5-10				
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	5-10	1.6-1.7	2.0-6.0	0.15-0.17	6.6-7.3	<2	LOW	.20	5	3	1-2	HIGH	LOW	
	18-27	1.6-1.9	0.6-2.0	0.14-0.18	6.6-7.3	<2	MODERATE	.17						
	13-18	1.7-1.9	2.0-6.0	0.12-0.14	7.4-8.4	<2	LOW	.20						
FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION	
FREQUENCY		DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)			TOTAL (IN)
NONE				>6.0			—		>60		—		B	MODERATE

FOOTNOTES		SANITARY FACILITIES			KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	1	4-8%: MODERATE: PERCS SLOWLY			FILL	191	ROADFILL		FAIR- LOW STRENGTH, SHRINK-SWELL	
		8+%: MODERATE: SLOPES, PERCS SLOWLY				2				
						3				
						4				
						5				
SEWAGE LAGOONS	1	4-7%: MODERATE: SLOPE, SEEPAGE			SAND	201	SAND		UNSUITED	
		7+% SEVERE: SLOPE				2				
						3				
						4				
						5				
SANITARY LANDFILL (TRENCH)	1	SEVERE: SEEPAGE			GRAVEL	211	GRAVEL		UNSUITED	
						2				
						3				
						4				
						5				
SANITARY LANDFILL (AREA)	1	4-8%: SLIGHT			SOIL	221	TOPSOIL		4-8%: FAIR: THIN LAYER	
		8+%: MODERATE: SLOPE				2			8+%: FAIR: THIN LAYER, SLOPE	
						3				
						4				
						5				
DAILY COVER FOR LANDFILL	1	4-8%: GOOD					FOOTNOTES		WATER MANAGEMENT	
		8+%: FAIR: SLOPE								
					PONDERS	231			SEEPAGE, SLOPE	
						2				
						3				
FOOTNOTES		BUILDING SITE DEVELOPMENT								
SHALLOW EXCAVATIONS	1	4-8%: SLIGHT			DIKES	211	EMBANKMENTS DIKES AND LEVEES		LOW STRENGTH, PIPING	
		8+%: MODERATE: SLOPE				2				
						3				
						4				
						5				
OWELLINGS WITHOUT BASEMENTS	1	4-8%: MODERATE: LOW STRENGTH, SHRINK-SWELL			PONDAQ	251	EXCAVATED PONDS AQUIFER FED		NO WATER	
		8+%: MODERATE: SLOPE, LOW STRENGTH, SHRINK-SWELL				2				
						3				
						4				
						5				
OWELLINGS WITH BASEMENTS	1	4-8%: SLIGHT			DRAIN	261	DRAINAGE		NOT NEEDED	
		8+%: MODERATE: SLOPE				2				
						3				
						4				
						5				
SMALL COMMERCIAL BUILDINGS	1	4-8%: MODERATE: SLOPE, SHRINK-SWELL			IRRIG	271	IRRIGATION		SLOPE	
		8+%: SEVERE: SLOPE				2				
						3				
						4				
						5				
LOCAL ROADS AND STREETS	1	4-8%: MODERATE: LOW STRENGTH, FROST ACTION			TERRAC	281	TERRACES AND DIVERSIONS		SLOPE	
		SHRINK-SWELL				2				
		8+%: MODERATE: SLOPE, LOW STRENGTH, FROST ACTION				3				
						4				
						5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS	1				WATERW		GRASSED WATERWAYS		SLOPE	
						2				
						3				
						4				
						5				

FOOTNOTES REGIONAL INTERPRETATIONS



BkF     Ka-Mb complex, 2 to 40 percent slopes

This mapping unit is a complex. It consists of about 55 percent Ka fine sandy loam, 15 to 40 percent slopes, about 35 percent Mb fine sand, 2 to 4 percent slopes and 10 percent other soils. This complex occurs along the upper perimeter of steep escarpments. The soils occur in an intermixed pattern as alternating small areas. The Ka soil occurs on moderately steep and steep, north and east facing slopes. The Mb soil occurs as wind deposited sand on gently undulating, nearly level areas. Natural vegetation is dominantly penstemon, peavine, Gambel oak, serviceberry, manzanita, pinyon pine and Utah juniper. Elevations range from 6,400 to 7,200 feet. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 110 to 140 days.

This complex occurs mainly on the south rim area of Glendale Bench.

Included with these soils in mapping are small areas of La very fine sandy loam, 2 to 4 percent slopes; small areas of Ja fine sandy loam, 2 to 8 percent slopes; small areas of a shallow, gravelly silt loam soil and small areas of Rock outcrop.

The Ka fine sandy loam, 15 to 40 percent slope is moderately deep and well drained. It occurs on upper terrace escarpments and formed in residuum from siltstone and limestone rocks of the Carmel formation. Slopes are 15 to 40 percent.

In a typical profile the surface layer is brown, fine sandy loam about 9 inches thick. The underlying layer is light gray and white cobbly loam about 19 inches thick. The next layer is white, very cobbly loam over fractured siltstone bedrock at depths of about 36 inches.

Permeability is moderate. Available water capacity is 2.0 to 3.5 inches above the bedrock. Organic matter content in the surface layer is low, about 1 percent. Effective rooting depth is 20 to 40 inches or more, but most roots are in the upper 20 inches. Surface runoff is medium and the erosion hazard is moderate under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. The Soil Erodibility Factor "K" value class is .20 in the upper 9 inches and .24 below 9 inches. The Soil Surface Factor (SSF) is 51.

A representative profile of Ka fine sandy loam, 15 to 40 percent slopes, about 2,000 feet north and 200 feet west of the southeast corner of section 27, T. 41 S., R. 7 W. in a rangeland area follows:

A11--0 to 2 inches; brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/2) when moist; weak, fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine, few fine and medium roots; 10 percent gravel; moderately calcareous, lime occurs in concretions; moderately alkaline (pH 8.2); abrupt smooth boundary.

A12--2 to 9 inches; brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/2) when moist; weak, fine granular structure; soft, friable, nonsticky, slightly plastic; many very fine, common fine and medium roots; 10 percent gravel; moderately calcareous, lime occurs in concretions; moderately alkaline (pH 8.4); clear, wavy boundary.

C1--9 to 14 inches; light gray (10YR 7/1) cobbly loam, grayish brown (10YR 5/2) when moist; moderate, medium subangular blocky structure; hard firm, slightly sticky, slightly plastic; few very fine, fine and medium roots; few very fine, common fine pores; 10 percent gravel and 10 percent cobble; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.6); gradual wavy boundary.

C2--14 to 28 inches; white (10YR 8/1) cobbly loam, light gray (10YR 7/2) when moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few very fine, fine and medium roots; few very fine and fine pores; 10 percent gravel, 45 percent cobble, common cicada casts; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.8); gradual wavy boundary.

C3--28 to 36 inches; white (10YR 8/1) very cobbly loam, light gray (10YR 7/2) when moist; rock structure; slightly hard, firm, sticky, plastic; few very fine and fine roots; 80 percent angular cobble; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.6); clear wavy boundary.

R--36 to 50 inches; white calcareous siltstone bedrock.

The depth to bedrock ranges from 20 to 40 inches

The Mb fine sand, 2 to 4 percent slopes is a deep and excessively drained soil. It occurs on nearly level terraces, generally near the terrace escarpments. It formed in eolian sand derived mainly from Navajo sandstone.

In a typical profile the surface layer is brown, fine sand about 14 inches thick. The underlying layer is a brown and strong brown, fine sand to a depth of 60 inches or more.

Permeability is rapid. Available water capacity is 3 to 5 inches to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 25 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor, "K" value class is .10. The Soil Surface Factor (SSF) is 32. Wind erosion is a problem in this sandy soil.

A representative profile of Mb fine sand, 2 to 4 percent slopes in mapping unit MbB, about 1,400 feet south and 1,100 feet east of the northwest corner of section 36, T. 41 S., R. 7 W. in a rangeland area follows:

A11--0 to 5 inches; brown (7.5YR 5/4) fine sand, brown or dark brown (7.5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; common very fine and fine, few medium roots; few fine pores; neutral (pH 6.8); clear smooth boundary.

A12--5 to 14 inches; brown (7.5YR 5/4) fine sand, brown or dark brown (7.5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; common very fine and fine, few medium roots; few fine pores; neutral (pH 6.8); clear smooth boundary.

C1--14 to 25 inches; brown (7.5YR 5/4) fine sand, dark yellowish brown (10YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; common very fine and fine, few medium roots; few fine pores; neutral (pH 7.2); gradual, smooth boundary.

C2--25 to 34 inches; strong brown (7.5YR 5/4) fine sand, brown or dark brown (7.5YR 4/4) when moist; weak, medium subangular blocky structure; soft very friable, nonsticky, nonplastic; few very fine, fine and medium roots; mildly alkaline (pH 7.6); gradual smooth boundary.

C3--34 to 51 inches; strong brown (7.5YR 5/6) loamy fine sand, reddish brown (5YR 4/4) when moist; weak, medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; moderately calcareous, lime is segregated in soft masses; moderately alkaline (pH 8.0).

The A1 horizon has hue of 7.5YR or 10YR, value of 5 or 6 dry, 4 moist and chroma of 3 or 4. It is mainly fine sand but ranges to loamy fine sand. It is 14 to 16 inches thick. The C horizon has hue of 7.5YR or 5YR, value of 5 or 6 dry, 4 or 5 moist and chroma of 4 through 6. It is dominantly noncalcareous but ranges from slightly calcareous to moderately calcareous below about 50 inches.

This complex is used mainly for rangeland and wildlife habitat.

Soil suitability for range seeding is poor for both soils. The limiting soil factor is low water holding capacity for the Ka soil and the sandy surface soil of the Mb soils. Plant species generally recommended for seeding includes intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 16 inches precipitation can be used. Equipment limitations are moderate, because of slope for the Ka soil and because of the sandy texture of the Mb soil.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Ka fine sandy loams (BkF)  
 STATE UTAH RECORD NO.  AUTHOR(S) YLM-DAL DATE 3/77 REVISED  UNIT MODIFIER   
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE Ka SERIES ARE MODERATELY DEEP WELL DRAINED SOILS FORMED IN RESIDUUM FROM SILTSTONE AND LIMESTONE ROCKS ON UPPER TERRACE, ESCARPMENTS, UNDER PINYON, JUNIPER AND SERVICEBERRY. MAAT IS 43 TO 45 %. AAP IS 14 TO 16 INCHES. FFP IS 110 TO 140 DAYS. A TYPICAL PROFILE HAS A BROWN FINE SANDY LOAM SURFACE LAYER ABOUT 9 INCHES THICK. THE UNDERLYING LAYER IS LIGHT GRAY COBBLY LOAM 19 INCHES THICK. THE NEXT LAYER IS WHITE VERY COBBLY LOAM OVER BEDROCK AT DEPTHS OF 36 INCHES. SLOPES ARE 15 TO 40 PERCENT.

## ESTIMATED SOIL PROPERTIES

DEPTH (IN)	USDA TEXTURE	UNIFIED	ASHO	FRACT. 3 IN. PCT	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX
					4	10	40	200		
0-9	FSL	SM	A-2, A-4	0	80-90	65-75	45-55	25-40	20-25	NP-2
9-28	CB-L	SM, SM-SC	A-4	40-50	70-80	60-70	50-65	35-50	25-30	NP-10
28-36	WB									
36	UWB									

DEPTH (IN)	CLAY (PCT OF <2µm)	MOIST BULK DENSITY (g/cm³)	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (mmhos/cm)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
10-18	10-18	1.7-1.8	0.6-2.0	0.10-0.12	7.9-8.4	<2	LOW	.20	3	3	1-2	HIGH	MODERATE
18-25	18-25	1.7-1.8	0.6-2.0	0.08-0.10	8.5-9.0	<2	LOW	.24					
SAME DEPTH AS ABOVE													

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6.0			-		24-40	RIPPABLE	-		B	MODERATE

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SEVERE: DEPTH TO ROCK, SLOPE			FILL	191	ROADFILL		15-25%: POOR: AREA RECLAIM 25%+: POOR: SLOPE, AREA RECLAIM	
					2				
					3				
					4				
					5				
SEWAGE LAGOONS	SEVERE: DEPTH TO ROCK, SLOPE			SAND	201	SAND		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)	15-25%: SEVERE: DEPTH TO ROCK 25%+: SEVERE: DEPTH TO ROCK, SLOPE			GRAVEL	211	GRAVEL		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)	SEVERE: SLOPE			SOIL	221	TOPSOIL		POOR SLOPE	
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL	POOR: SLOPE, THIN LAYER, AREA RECLAIM			PONERS	231	POND RESERVOIR AREA		DEPTH TO ROCK, SLOPE	
					2				
					3				
					4				
					5				
SHALLOW EXCAVATIONS	SEVERE: DEPTH TO ROCK, SLOPE			DIKES	241	EMBANKMENTS DIKES AND LEVEES		SEEPAGE, LARGE STONE	
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS	SEVERE: SLOPE			POND4Q	251	EXCAVATED PONDS AQUIFER FEED		NO WATER	
					2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS	SEVERE: DEPTH TO ROCK, SLOPE			DRAIN	261	DRAINAGE		NOT NEEDED	
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE			IRRG	271	IRRIGATION		LARGE STONES, ROOTING DEPTH, SLOPE	
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS	SEVERE: SLOPE			TERFAC	281	TERFACES AND DIVERGINGS		LARGE STONES, SLOPE	
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRASSED WATERWAYS		LARGE STONE, SLOPE, DEPTH TO ROCK	
					2				
					3				
					4				
					5				

FOOTNOTES REGIONAL INTERPRETATIONS

[illegible][illegible][illegible]

COMMON PLANT NAME		PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (LEAF WEIGHT BY CLASS-DETERMINING PHASE)			
		ALL				
BLACK GRAMA	BOER4	2				
BLUE GRAMA	BOGR2	2				
GALLETA	HIJA	2				
INDIAN RICEGRASS	ORHY	7				
NEVADA BLUEGRASS	PONE3	5				
OTHER PERENNIAL GRASSES	PPGG	7				
OTHER PERENNIAL FORBS	PPFF	5				
SHRUBLIVE OAK	QUTU2	12				
PINYON	PIED	12				
UTAH JUNIPER	JUOS	8				
UTAH SERVICEBERRY	AMUT	5				
YELLOWLEAF SILKTASSEL	GAFL2	7				
OTHER SHRUBS	SSSS	30				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.)						
FAVORABLE YEARS		2000				
NORMAL YEARS						
UNFAVORABLE YEARS		850				

[illegible]

# SOIL INTERPRETATIONS RECORD

MLRA(S) 35		KIND OF UNIT SERIES		UNIT NAME Mb fine sand (S&F)							
STATE UTAH		AUTHOR(S) VLM		DATE 4/77							
CLASSIFICATION AND BRIEF SOIL DESCRIPTION		REVISED		UNIT MODIFIED							
THE Mb SERIES CONSISTS OF DEEP EXCESSIVELY DRAINED SOILS FORMED IN WINDBLOWN SANDS ON NEARLY LEVEL TERRACES UNDER INDIAN RICEGRASS, SPIKE DROPSEED, BIG SAGEBRUSH AND GAMBEL OAK. MAAT IS 43 TO 46 F. AAP IS 14 TO 16 INCHES. FFP IS 110 TO 130 DAYS. A TYPICAL PROFILE HAS BROWN, FINE SAND SURFACE LAYER ABOUT 14 INCHES THICK. THE UNDERLYING LAYERS ARE BROWN AND STRONG BROWN FINE SAND TO A DEPTH OF 60 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.											
ESTIMATED SOIL PROPERTIES											
FOOTNOTE											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. < 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE	LIQUID LIMIT	PLASTICITY INDEX				
0-60	FS	SP-SM, SM	A-3, A-2	0	100 100 70-95 5-15	-	NP				
DEPTH (IN)	CLAY (PCT OF < 2MM)	MOIST BULK DENSITY (G CM <sup>3</sup> )	PERMEABILITY (IN HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS	WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY
SAME DEPTH AS ABOVE	2-5	1.7-1.8	6.0-20	0.06-0.08	6.6-8.4	<2	LOW	K 10 T 5	1	<.5	STEEL HIGH CONCRETE LOW
FLOODING		HIGH WATER TABLE		CEMENTED PAN		SEDIMENT		SUBSIDENCE		HYD CRP	
FREQUENCY		DURATION		MONTHS		DEPTH (IN)		HARDNESS		INITIAL (IN) TOTAL (IN)	
NONE		>6.0		KIND MONTHS		DEPTH (IN) HARDNESS		DEPTH (IN) HARDNESS		INITIAL (IN) TOTAL (IN)	
FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL			
SEPTIC TANK ABSORPTION FIELDS		A SLIGHT:		FILL 191		B GOOD		ROADFILL			
SEWAGE LAGOONS		SEVERE: SEEPAGE		SAND 201		POOR: EXCESS FINES		SAND			
SANITARY LANDFILL (TRENCH)		SEVERE: SEEPAGE, TOO SANDY		GRAVEL 211		UNSUITED		GRAVEL			
SANITARY LANDFILL (AREA)		SEVERE: SEEPAGE		SOIL 221		POOR: TOO SANDY		TOPSOIL			
DAILY COVER FOR LANDFILL		POOR: TOO SANDY, SEEPAGE		PONDERS 231		FOOTNOTES		WATER MANAGEMENT			
FOOTNOTES		BUILDING SITE DEVELOPMENT		DIKES 241		SEEPAGE, SLOPE		POND RESERVOIR AREA			
SHALLOW EXCAVATIONS		SEVERE: CUTBANKS CAVE		PONDAGE 251		SEEPAGE, PIPING		EMBANKMENTS DIKES AND LEVEES			
DWELLINGS WITHOUT BASEMENTS		SLIGHT		DRAIN 261		NO WATER		EXCAVATED PONDS AQUIFER FED			
DWELLINGS WITH BASEMENTS		SLIGHT		IRRIG 271		NOT NEEDED		DRAINAGE			
SMALL COMMERCIAL BUILDINGS		SLIGHT		TERRAC 281		FAST INTAKE, SOIL BLOWING, DROUGHTY		IRRIGATION			
LOCAL ROADS AND STREETS		SLIGHT		WATERW 291		TOO SANDY, SOIL BLOWING, SLOPE		TERRACES AND DIVERSIONS			
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS						DROUGHTY, SLOPE		GRASED WATERWAYS			
FOOTNOTE		REGIONAL INTERPRETATIONS		33							

UNIT MODIFIER.

FOOTNOTE		KEEPING ONLY		FOOTNOTE	
CAMP AREAS	SEVERE: TOO SANDY	PLAYGROUNDS	321	PLAYGROUNDS	SEVERE: TOO SANDY
			2		
			3		
			4		
			5		
PICNIC AREAS	SEVERE: TOO SANDY	PATHS	331	PATHS AND TRAILS	SEVERE: TOO SANDY
			2		
			3		
			4		
			5		

## CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

[illegible]

WOODLAND SUITABILITY

[illegible]

WINDBREAKS

[illegible]

## MIDLIFE HABITAT STABILITY

[illegible]

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)

COMMON PLANT NAME		PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT BY CLASS-DETERMINING PHASE)			
		ALL				
BLACK GRAMA	BOER4	3				
INDIAN RICEGRASS	ORHY	12				
NEEDLEANDTHREAD	STC04	5				
SAND DROPSEED	SPCR	5				
SIDE OATS GRAMA	BOCU	5				
SPIKE DROPSEED	SPC04	10				
OTHER PERENNIAL GRASSES	PPGG	15				
STICKSEED	LAPPU	2				
OTHER PERENNIAL FORBS	PPFF	8				
BIG SAGEBRUSH	ARTR2	7				
FOURWING SALTBUSH	ATCA2	7				
GAMBEL OAK	QUGA	5				
GREENLEAF MANZANITA 1/	ARPA6	5				
WINTERFAT	EVLA5	5				
OTHER SHRUBS	SSSS	6				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.)						
FAVORABLE YEARS		1000				
NORMAL YEARS						
UNFAVORABLE YEARS		500				

## FOOTNOTES

[illegible]

CaB Ca cobbly very fine sandy loam, 0 to 4 percent slopes

This soil is moderately deep and well drained. It occurs on basalt flow terraces and are generally adjacent to short and medium length lava flow escarpments at elevations ranging from 6,000 to 6,800 feet. This soil formed in aeolian material, derived mainly from Navajo sandstone, and residuum from scoriaceous basalt. Average annual precipitation is 14 to 17 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 120 to 140 days. Natural vegetation is dominantly needle and thread grass, blue grama, dryland sedge, sand dropseed, bitterbrush, Gambel oak, big sagebrush, Utah juniper and pinyon pine.

This soil occurs mainly in the vicinity of Black Knoll and Bold Knoll.

Included with this soil in mapping are small areas of basalt Rock outcrop; and small areas that have a very cobbly fine sandy loam surface.

In a typical profile the surface layer is brown, cobbly very fine sandy loam about 10 inches thick. The subsoil is strong brown and yellowish red, cobbly and very cobbly sandy clay loam over basalt bedrock at depths of about 32 inches.

Permeability is moderate above the bedrock. Available water capacity is 2 to 4 inches above the bedrock. Organic matter content in the surface layer is low about 1 percent. Effective rooting depth is 20 to 40 inches, but most roots are in the upper 20 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .17 in the upper 10 inches and .15 below 10 inches. The Soil Surface Factor (SSF) is 16.

This soil is used for rangeland and wildlife habitat.

A representative profile of Ca cobbly very fine sandy loam, 0 to 4 percent slopes about 2,100 feet south and 2,300 feet east of the NW corner of section 35, T. 40 S., R. 6 W. in a rangeland area follows:

A11--0 to 2 inches; brown (7.5YR 5/3) cobbly loam very fine sand, dark brown (7.5YR 3/3) when moist; weak, fine granular structure; loose, very friable, nonsticky, nonplastic; common very fine and few fine roots; 20 percent cobbles; slightly acid (pH 6.1) clear smooth boundary.

A12--2 to 10 inches; brown (7.5YR 5/3) cobbly very fine sandy loam, dark brown (7.5YR 3/3) when moist; weak, fine subangular blocky structure that parts to weak medium granular; soft, very friable, nonsticky, nonplastic; common very fine and fine, few medium roots; few very fine and few fine pores; 20 percent cobbles and gravel; neutral (pH 7.0); clear smooth boundary.

B1--10 to 13 inches; brown (7.5YR 5/4) cobbly heavy fine sandy loam, dark brown or brown (7.5YR 4/4) when moist; weak, medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine and medium roots; common very fine and fine pores; 35 percent basalt cobbles; mildly alkaline (pH 7.4); clear wavy boundary.

B2lt--13 to 20 inches; strong brown (7.5YR 5/6) cobbly sandy clay loam, reddish brown (5YR 4/4) when moist; moderate, medium subangular blocky structure; hard, friable, slightly sticky, plastic; few very fine and medium, common fine roots; common very fine and fine pores; few thin clay films in pores and on faces of peds; 30 percent cobbles and 10 percent gravel; neutral (pH 7.3); clear wavy boundary.

B22t--20 to 32 inches; yellowish red (5YR 5/6) very cobbly sandy clay loam, reddish brown (5YR 4/4) when moist; strong medium subangular blocky structure; very hard, firm, slightly sticky, plastic; few fine and very fine roots; common fine and very fine pores; few thin continuous clay films on faces of peds and in pores; 50 percent cobbles and 20 percent gravel; mildly alkaline (pH 7.4); clear wavy boundary.

R--32 inches; basalt bedrock

The A1 horizon has hue of 10YR and 7.5YR, value of 4 or 5 dry, 3 moist and chroma of 2 or 3. It is dominantly cobbly very fine sandy loam, but in some places may be gravelly fine sandy loam or have a thin surface layer of loamy very fine sand. Coarse fragments in the surface layer range from 0 to 25 percent cobbles and gravel. The A1 horizon ranges from 7 to 11 inches thick. The B2t horizon has hue of 5YR or 7.5YR, value of 4 or 5 dry and 4 moist and chroma of 3 through 6. It is dominantly very cobbly sandy clay loam, but ranges to cobbly heavy fine sandy loam in the upper part of the B2t horizon. Coarse fragments range from 10 to 25 percent gravel and 25 to 50 percent cobble. Depth to basalt bedrock ranges from 20 to 40 inches.

Soil suitability for range seeding is poor because of low water holding capacity. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in area with 14 to 17 inches precipitation can be used. Equipment limitations are slight.



CaB Landscape view of Ca cobbly very fine sandy loam, 0 to 4 percent slopes. The vegetation is dominantly big sagebrush, needleandthread grass, blue grama, sand dropseed, bitterbrush and scattered Utah juniper and pinyon pine.



# SOIL INTERPRETATIONS RECORD

U. S. DEPARTMENT OF AGRICULTURE  
NATIONAL COOPERATION SERVICE

(CaB)

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Ca cobbly very fine sandy loam  
STATE UTAH RECORD NO.        AUTHOR(S) DAL-VLM DATE 4/77 REVISED    UNIT MODIFIER         
CLASSIFICATION AND BRIEF DESCRIPTION

THE Ca SERIES ARE MODERATELY DEEP, WELL DRAINED SOILS FORMED IN EOLIAN SAND OVER SCORIEOUS BASALT ON TERRACES AT ELEVATIONS OF 6,000 TO 6,800 FEET. VEGETATION IS BLACK SAGEBRUSH, WHEATGRASS AND, GALLET. MAAT IS 43 TO 45 F., AAP IS 14 TO 17 INCHES, FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A BROWN, COBBLY VERY FINE SANDY LOAM SURFACE LAYER 10 INCHES THICK. THE SUBSOIL IS STRONG BROWN, VERY COBBLY SANDY CLAY LOAM, 22 INCHES THICK UNDERLAIN BY BASALT BEDROCK. SLOPES ARE 0 TO 4 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
A 0-10	CB-VFSL	SM	A-2, A-4	15-20	80-90	75-85	55-70	30-45	15-25	NP-5				
10-32	CBV-SCL, CB-FSL	SM, SC, SC-SM	A-4, A-6	40-60	80-90	75-85	60-75	35-50	15-30	NP-15				
32	UNB													
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (%/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	9-16	1.6-1.7	2.0-6.0	0.03-0.10	6.1-7.3	< 2	LOW	.17	3	8	1-2	HIGH	MODERATE	
	20-30	1.7-1.9	0.6-2.0	0.03-0.12	6.6-7.8	< 2	LOW	.15						
FLOODING			HIGH WATER TABLE			CEMENTED PAV		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION	
FREQUENCY		DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE				> 6.0			-		24-36	HARD	-		B	MODERATE

FOOTNOTES			SANITARY FACILITIES			KEYING ONLY	FOOTNOTES			CONSTRUCTION MATERIAL		
SEPTIC TANK ABSORPTION FIELDS	SEVERE: DEPTH TO ROCK			FILL	191		ROADFILL	POOR: THIN LAYER, AREA RECLAIM				
					2							
					3							
					4							
					5							
SEWAGE LAGOONS	SEVERE: DEPTH TO ROCK			SAND	201		SAND	UNSUITED				
					2							
					3							
					4							
					5							
SANITARY LANDFILL (TRENCH)	SEVERE: DEPTH TO ROCK			GRAVEL	211		GRAVEL	UNSUITED				
					2							
					3							
					4							
					5							
SANITARY LANDFILL (AREA)	SLIGHT			SOIL	221		TOPSOIL	POOR: LARGE STONES: AREA RECLAIM				
					2							
					3							
					4							
					5							
DAILY COVER FOR LANDFILL	POOR: THIN LAYER, LARGE STONES					PONDS	231	FOOTNOTES			WATER MANAGEMENT	
							2	POND RESERVOIR AREA	DEPTH TO ROCK			
							3					
							4					
							5					
SHALLOW EXCAVATIONS	SEVERE: DEPTH TO ROCK, LARGE STONES			DIKE	241		2	EMBANKMENTS Dikes AND LEVEES	THIN LAYER, LARGE STONES			
							3					
							4					
							5					
DWELLINGS WITHOUT BASEMENTS	MODERATE: DEPTH TO ROCK			POND-Q	251		2	EXCAVATED POND-AQUIFER FED	NO WATER			
							3					
							4					
							5					
DWELLINGS WITH BASEMENTS	SEVERE: DEPTH TO ROCK			DRAIN	261		2	DRAINAGE	NOT NEEDED			
							3					
							4					
							5					
SMALL COMMERCIAL BUILDINGS	MODERATE: DEPTH TO ROCK			IRRIG	271		2	IRRIGATION	ROOTING DEPTH, LARGE STONES			
							3					
							4					
							5					
LOCAL ROADS AND STREETS	MODERATE: DEPTH TO ROCK, FROST ACTION			TERRACE	281		2	TERRACES AND OVERSOWS	DEPTH TO ROCK, LARGE STONES			
							3					
							4					
							5					
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERWAY			2	GRASSED WATERWAYS	ROOTING DEPTH, DEPTH TO ROCK, LARGE STONES			
							3					
							4					
							5					

FOOTNOTES		REGIONAL INTERPRETATIONS	

UNIT NAME: Ca RECREATIONAL DEVELOPMENT

UNIT MODIFIER:

FOOTNOTE

KEYING ONLY

- FOOTNOTE

POSTNOTE		REFERENCE ONLY				
CAMP AREAS	MODERATE: LARGE STONES	PLAYGRO	321	PLAYGROUNDS	SEVERE: LARGES STONE, DEPTH TO ROCK	
					2	
					3	
					4	
					5	
PICKNICK AREAS	MODERATE: LARGE STONES	PATHS	331	PATHS AND TRAILS	MODERATE: LARGE STONES	
					2	
					3	
					4	
					5	

## CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE HIGH LEVEL MANAGEMENT)

[illegible]

## WOODLAND SUITABILITY

[illegible]

## WINDBREAKS

[illegible]

## WILDLIFE HABITAT SUITABILITY

[illegible]

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)

COMMON PLANT NAME	PLANT SYMBOL (NLSFN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS - DETERMINING PHASE			
		ALL			
BLUEBUNCH WHEATGRASS	AGSP	6			
DRYLAND SEDGE	CAREX	9			
GALLET	HIJA	6			
INDIAN RICEGRASS	ORHY	13			
NEEDLEANDTHREAD	STCO4	10			
WESTERN WHEATGRASS	AGSM	5			
OTHER PERENNIAL GRASSES	PPGG	21			
OTHER PERENNIAL FORBS	PPFF	5			
ANTELOPE BITTERBRUSH	PUTR2	8			
BLACK SAGEBRUSH	ARARN	5			
OTHER SHRUBS	SSSS	12			
POTENTIAL PRODUCTION (LBS./AC. DRY WT):					
FAVORABLE YEARS		1500			
NORMAL YEARS					
UNFAVORABLE YEARS		730			

## FOOTNOTES

ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH.

DaA     Da fine sandy loam, 0 to 2 percent slopes

This soil is deep and well drained. It occurs in alluvial valleys and on flood plains at elevations of 6,000 to 6,400 feet. This soil formed in alluvium derived from sandstone and siltstone. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 47° to 48° F., and the frost-free season is 120 to 140 days. Natural vegetation is dominantly squirreltail, cheatgrass, eriogonum, scurf pea, big sagebrush and scattered Utah juniper.

The soil occurs mainly in the Ford Pasture area and upper Johnson Wash.

Included with this soil in mapping are small areas of Aa clay loam, 2 to 4 percent slopes; small areas of Ja fine sandy loam, 2 to 8 percent slopes and small areas of Ca cobbly very fine sandy loam, 0 to 4 percent slopes.

In a typical profile the surface layer is dark grayish brown and dark brown fine sandy loam about 14 inches thick. The underlying layer is brown, fine sandy loam about 15 inches thick. The next layer is brown, loamy fine sand about 6 inches thick. The next layer is yellowish brown, fine sandy loam stratified with light brown, fine sand to depths of 60 inches or more.

Permeability is moderately rapid. Available water capacity is 5 to 7.5 inches to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 14 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .24 in the upper 29 inches and .17 below 29 inches. The Soil Surface Factor (SSF) is 35.

This soil is used for rangeland and wildlife habitat.

A representative profile of Da fine sandy loam, 0 to 2 percent slopes, about in the SW 1/4 of the SE 1/4 of section 3, T. 41 S., R. 5 W. in a rangeland area follows:

Ap--0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) when moist; weak, medium platy structure; soft, very friable, nonsticky, nonplastic; many very fine, few fine and medium roots; few very fine and medium pores; slightly calcareous, lime is disseminated; mildly alkaline (pH 7.4); clear, wavy boundary.

A12--6 to 14 inches; dark brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/3) when moist; weak, coarse subangular blocky structure that parts to moderate medium subangular blocky; slightly hard, friable, nonsticky, nonplastic; few fine, very fine and medium roots; common fine and very fine, few medium pores; mildly alkaline (pH 7.6); clear, wavy boundary.

B2--14 to 29 inches; brown (7.5YR 5/4) fine sandy loam, brown or dark brown (7.5YR 4/4) when moist; weak, coarse subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few very fine, fine and medium roots; common very fine and fine, few medium pores; mildly alkaline (pH 7.6); clear, wavy boundary.

C1--29 to 35 inches; brown (7.5YR 5/4) loamy fine sand, brown or dark brown (7.5YR 4/4) when moist; weak, medium subangular blocky; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; few fine, common very fine pores; moderately alkaline (pH 8.4); clear wavy boundary.

C2--35 to 54 inches; yellowish brown (10YR 5/4) fine sandy loam, dark yellowish brown (10YR 4/4) when moist; weak, medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few fine, very fine and medium roots; few very fine, common fine pores; moderately calcareous; lime is in fine veins; moderately alkaline (pH 8.4); clear irregular boundary.

C3--54 to 68 inches; light brown (7.5YR 6/4) fine sand, brown (7.5YR 5/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; slightly calcareous, lime is disseminated; strongly alkaline (pH 8.6).

The A1 horizon has hue of 7.5YR or 10YR, value of 3 through 5 dry and 2 or 3 moist and chroma of 2 or 3. It is dominantly fine sandy loam, but is marginal to loamy fine sand in places. It is 8 to 18 inches thick. The B2 horizon has hue of 7.5YR or 10YR, value of 4 or 5 dry and 3 or 4 moist and chroma of 3 or 4. It is 7 to 15 inches thick. The C horizon is commonly stratified. The dominant layers are fine sandy loam, but having strata of loamy fine sand, fine sand, silt loam and loam. In places, basalt bedrock occurs at depths of 40 to 60 inches.

Soil suitability for range seeding is good. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass. Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 17 inches precipitation can be used. Equipment limitations are slight.



DaA Landscape view of Da fine sandy loam, 0 to 2 percent slopes in the foreground. Vegetation is dominantly squirreltail, bluebunch wheatgrass, big sagebrush and scattered Utah juniper. In the background is mapping unit XJH - Typic Ustorthents, sandy-skeletal, mixed, (calcareous), mesic.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Da fine sandy loam (DaA)  
 STATE UTAH RECORD NO.  AUTHOR(S) VLM DATE 4-77 REVISED  UNIT MODIFIER   
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE Da SERIES ARE VERY DEEP, WELL DRAINED SOILS FORMED IN ALLUVIUM FROM SANDSTONE AND SILTSTONE ON NEARLY LEVEL VALLEYS UNDER BIG SAGEBRUSH, BLUEBUNCH WHEATGRASS AND NEVADA BLUEGRASS. MAAT IS 47 TO 48 F. AAP IS 14 TO 16 INCHES AND THE FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A DARK GRAYISH BROWN FINE SANDY LOAM SURFACE ABOUT 14 INCHES THICK. THE UNDERLYING LAYER IS STRATIFIED BROWN FINE SANDY LOAM AND LOAMY FINE SAND TO 60 INCHES OR MORE. SLOPES ARE 0 TO 2 PERCENT.

FOOTNOTE		ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX			
					4	10	40	200					
A 0-29	FSL	SM	A-2	0	100	100	70-95	20-35	20-25	NP-5			
29-68	FSL, LFS, FS	SM	A-2	0	100	100	60-95	20-35	15-25	NP-5			
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS K T	WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
	10-18	1.6-1.7	2.0-6.0	0.12-0.14	7.4-7.8	< 2	LOW	.24 5	3	< 5-1	STEEL	CONCRETE	
	10-18	1.7-1.8	2.0-6.0	0.07-0.09	7.9-9.0	< 2	LOW	.17			HIGH	MODERATE	
SAME DEPTH AS ABOVE													
FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			> 6.0					> 60				A	MODERATE
FOOTNOTES		SANITARY FACILITIES				KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL			
SEPTIC TANK ABSORPTION FIELDS		SLIGHT:				FILL 191		ROADFILL		GOOD:			
						2							
						3							
						4							
						5							
SEWAGE LAGOONS		SEVERE: SEEPAGE				SAND 201		SAND		POOR: EXCESSIVE FINES			
						2							
						3							
						4							
						5							
SANITARY LANDFILL (TRENCH)		SEVERE: SEEPAGE				GRAVEL 211		GRAVEL		UNSUITED:			
						2							
						3							
						4							
						5							
SANITARY LANDFILL (AREA)		SEVERE: SEEPAGE				SOIL 221		TOPSOIL		GOOD:			
						2							
						3							
						4							
						5							
DAILY COVER FOR LANDFILL		GOOD:						POND RESERVOIR AREA		SEEPAGE:			
						PONDERS 231							
						2							
						3							
						4							
FOOTNOTES		BUILDING SITE DEVELOPMENT						FOOTNOTES		WATER MANAGEMENT			
SHALLOW EXCAVATIONS		SLIGHT:				DIKES 241		EMBANKMENTS DIKES AND LEVEES		SEEPAGE, PIPING			
						2							
						3							
						4							
						5							
DWELLINGS WITHOUT BASEMENTS		SLIGHT:				PONDAQ 251		EXCAVATED PONDS AQUIFER FED		NO WATER			
						2							
						3							
						4							
						5							
DWELLINGS WITH BASEMENTS		SLIGHT:				DRAIN 261		DRAINAGE		NOT NEEDED			
						2							
						3							
						4							
						5							
SMALL COMMERCIAL BUILDINGS		SLIGHT:				IRRIG 271		IRRIGATION		DROUGHTY			
						2							
						3							
						4							
						5							
LOCAL ROADS AND STREETS		MODERATE: FROST ACTION				TERRAC 281		TERRACES AND DIVERSIONS		NOT NEEDED			
						2							
						3							
						4							
						5							
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS						WATERW		GRASSED WATERWAYS		DROUGHTY			
						2							
						3							
						4							
						5							
FOOTNOTES		REGIONAL INTERPRETATIONS											

42

EaG    Ea fine sand, 15 to 40 percent slopes

This soil is shallow and well drained. It occurs on rolling upland slopes at elevations of 6,400 to 6,600 feet. This soil formed in residuum from sandstone. Average annual precipitation is 15 to 17 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 130 to 150 days. Natural vegetation is penstemon, snowberry, serviceberry, yellowbrush, Gambel oak, pinyon pine and Utah juniper.

This soil occurs mainly in the Sink Valley Wash Area.

Included with this soil in mapping are small areas of XJ soils, 40 to 80 percent slopes; small areas of Ja fine sandy loam, 2 to 8 percent slopes; small areas of Da fine sandy loam, 0 to 2 percent slopes and small areas of gypsum rock outcrop. Also included are areas of very gravelly and very cobbly or stony sandy loam soils.

In a typical profile the surface layer is yellowish red, fine sand about 4 inches thick. The underlying layer is yellowish red fine sand, underlain by weakly cemented sandstone that can be cut with a spade and is easily broken by hand and is underlain by consolidated sandstone at depths of about 50 inches.

Permeability is slow below about 11 inches. Available water capacity is 4.0 inches to a depth of about 50 inches. Organic matter content in the surface layer is very slow, less than 1 percent. Effective rooting depth is 40 to 60 inches, but most roots are in the upper 1 inch. Surface runoff is rapid and the erosion hazard is high. Wind erosion is a problem on this sandy soil. The Soil Erodibility Factor "K" value class is .15 in the upper 11 inches. The Soil Surface Factor (SSF) is 69.

This soil is used for rangeland and wildlife habitat.

A representative profile of Ea fine sand, 15 to 40 percent slopes, about 1,900 feet south and 2,100 feet west of the northeast corner of section 31, T. 40 S., R. 5 W. in a rangeland area follows:

A1--0 to 4 inches; yellowish red (5YR 5/6) fine sand, yellowish red (5YR 4/6) when moist; weak, medium platy structure that parts to single grain; loose, nonsticky, nonplastic; few fine and medium roots and common very fine and coarse roots; few very fine pores; slightly calcareous; strongly alkaline (pH 8.8); clear smooth boundary.

C1--4 to 11 inches; yellowish red (5YR 5/6) fine sand, yellowish red (5YR 4/6) when moist; massive; loose, nonsticky, nonplastic; few very fine, fine medium and coarse roots; few very fine pores; slightly calcareous; strongly alkaline (pH 8.7); gradual, smooth boundary.

C2--11 to 50 inches; yellowish red (5YR 5/6) fine sand, yellowish red (5YR 5/6) when moist; rock structure; slightly hard, very friable, nonsticky, nonplastic; few very fine, fine, medium and coarse roots; few very fine pores; slightly calcareous, lime occurs as few thin lime veins in fractures; strongly alkaline (pH 9.0); abrupt, smooth boundary.

R--50 inches; sandstone bedrock; few fine and very fine roots in rock fractures.

The A1 horizon has hue of 7.5YR or 5YR, value of 5 or 6 dry, 4 or 5 moist and chroma of 4 through 6. It is fine sand marginal to loamy fine sand and is 4 to 9 inches thick. Depth to the weakly cemented sandstone ranges from 9 to 20 inches. This material is cracked and jointed and roots penetrate along these fractures. It can be cut with a spade, can be easily ripped and trenched in most areas. Depth to the consolidated sandstone ranges from 40 to 60 inches.

Soil suitability for range seeding is very poor, because of the low water holding capacity and the fine sand surface soil. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 15 to 17 inches precipitation can be used. Equipment limitations are moderate, because of slope.



EaG Landscape view of Ea fine sand, 15 to 40 percent slopes. The vegetation is dominantly Utah juniper, pinyon pine, Gambel oak, snowberry, big sagebrush, yellowbrush and serviceberry.



EaG Profile of Ea fine sand, 15 to 40 percent slopes. The A1 horizon is only about 4 inches thick. Rock structure occurs at depth of about 11 inches consolidated sandstone at depth of about 50 inches. Classification is mixed, mesic Typic Ustipsamments.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Ea fine sand (EaG)  
 STATE UTAH RECORD NO.  AUTHOR(S) VLM DATE 4/77 REVISED  UNIT MODIFIER   
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE Ea SERIES ARE SHALLOW, WELL DRAINED SOILS, FORMED IN RESIDUUM FROM SANDSTONE ON UPLAND SLOPES. ELEVATIONS RANGE 6,400 TO 6,600 FEET. NATURAL VEGETATION IS PINYON PINE, UTAH JUNIPER, BLUEBUNCH WHEATGRASS, INDIAN RICEGRASS AND BIG SAGEBRUSH. MAAT IS 43 TO 45 F. AAP IS 15 TO 17 INCHES. FFP IS 130 TO 150 DAYS. A TYPICAL PEDON HAS A YELLOWISH RED FINE SAND SURFACE ABOUT 11 INCHES THICK. THE UNDERLYING LAYER IS YELLOWISH RED FINE SAND, (WEAKLY CEMENTED), 30 INCHES THICK OVER SANDSTONE. SLOPES ARE 15 TO 40 PERCENT.

FOOTNOTE		ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX			
					4	10	40	200					
A 0-11	FS	SM, SP-SM	A-2	0	0	0	65-80	10-35	15-20	NP			
11-50	FS	SM, SP-SM	A-2	0	0	0	65-80	10-35	15-20	NP			
50	UWB												
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
SAME DEPTH AS ABOVE	5-10	1.7-1.8	2.0-6.0	0.06-0.08	8.5-9.0	<2	LOW	.15	1	1	<.5	HIGH	MODERATE
	5-10	1.7-1.8	0.06-.2	0.06-0.08	8.5-9.0	<2	LOW	.15					

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6.0			-		40-60	RIPPABLE	-		C	LOW

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SEVERE: SLOPE, PERCS SLOWLY			FILL	191	ROADFILL		15-25%: FAIR: SLOPE 25+%: POOR: SLOPE	
					2				
					3				
					4				
					5				
SEWAGE LAGOONS	SEVERE: SLOPE			SAND	201	SAND		POOR: EXCESS FINES	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)	15-25%: MODERATE: SLOPE 25+%: SEVERE: SLOPE			GRAVEL	211	GRAVEL		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)	SEVERE: SLOPE			SOIL	221	TOPSOIL		POOR: TOO SANDY, SLOPE	
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL	POOR: SLOPE, TOO SANDY			PONDS	231	POND RESERVOIR AREA		SLOPE	
					2				
					3				
					4				
					5				
SHALLOW EXCAVATIONS	SEVERE: SLOPE			DIKE	241	EMBANKMENTS DIKES AND LEVES		PIPING	
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS	SEVERE: SLOPE			POND Q	251	EXCAVATED PONDS AQUIFER FED		NO WATER	
					2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS	SEVERE: SLOPE			DRAIN	261	DRAINAGE		NOT NEEDED	
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE			IRRIG	271	IRRIGATION		SLOPE, SOIL BLOWING, DROUGHTY	
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS	SEVERE: SLOPE			TERRACE	281	TERRACES AND DIVERSIONS		SLOPE, TOO SANDY, PIPING	
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERWAY		GRADED WATERWAYS		SLOPE, DROUGHTY	
					2				
					3				
					4				
					5				

FOOTNOTES REGIONAL INTERPRETATIONS

[illegible][illegible][illegible]

COMMON PLANT NAME		PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION DRY WEIGHT BY CLASS-DETERMINING PHASE			
		ALL				
BLACK GRAMA	BOER4	3				
INDIAN RICEGRASS	ORHY	12				
NEEDLEANDTHREAD	STCO4	5				
SAND DROPSEED	SPCR	5				
SIDEOATS GRAMA	BOCU	5				
SPIKE DROPSEED	SPCO4	10				
OTHER PERENNIAL GRASSES	PPGG	15				
STICKSEED	LAPPU	2				
OTHER PERENNIAL FORBS	PPFF	8				
BIG SAGEBRUSH	ARTR2	7				
FOURWING SALT BUSH	ATCA2	7				
GAMBEL OAK	QUGA	5				
GREENLEAF MANZANITA 1/	ARPA6	5				
WINTER FAT	EVLA5	5				
OTHER SHRUBS	SSSS	6				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.):						
FAVORABLE YEARS		1000				
NORMAL YEARS						
UNFAVORABLE YEARS		500				

[illegible]

Fa Fluvaquents and Torrifluents, sandy

This mapping unit is a complex. It occurs in the flood plain of the lower Kanab Creek. It consists of about 55 percent Fluvaquents, 35 percent Torrifluents and 10 percent other soils. Included with these soils in mapping are small areas of Me sand, 2 to 10 percent slope and small areas of Ha silt loam, 0 to 4 percent slopes.

The Fluvaquents soils occur in the swales, oxbows, and braided stream deposits. The Torrifluents soils occur on slightly higher terraces and benches, mostly along the outside edges of the flood plains.

This complex occurs mainly along the lower Kanab Creek bottom.

The Fluvaquent soils are deep, somewhat poorly drained and poorly drained. They formed in sandy alluvial deposits from sandstone, limestone and shale. Slopes range from 0 to 2 percent. Elevation is 5,000 to 6,000 feet. Average annual precipitation is 12 to 14 inches; mean annual temperature is 48 to 54° F; and the frost-free season is 150 to 160 days. The vegetation consists of sedges, cottonwood and willows.

The soil texture is dominantly fine sand, but is commonly stratified with layers of fine sandy loam, coarse sand and silt loam. In most places, cobble and gravel occurs in the profile and on the surface. Depth to water-table fluctuates with the water level of the creek, and during periods of high runoff, much of this soil is inundated for short periods of time. This high runoff can occur in the winter, spring or late summer. Permeability is rapid. Surface runoff is slow and erosion hazard is slight.

The Torrifluent soils are deep, well drained and moderately well drained. They formed in alluvial deposits from sandstone, limestone and shale. Slopes range from 0 to 4 percent. Elevations are from 5,000 to 6,000 feet. The natural vegetation consists of galleta, sand dropseed, Indian ricegrass, red willow and black willow trees. Average annual precipitation is 12 to 14 inches; mean annual temperature is 48 to 54° F., and the frost-free season is 150 to 160 days. The soil texture is dominantly loamy fine sand and fine sand, but strata of loam, silt loam, fine sandy loam and very fine sandy loam occurs in most profiles.

The normal water table is below 48 inches, but varies with the water level in the creek during periods of high runoff. Permeability is rapid. Runoff is slow and erosion hazard is slight.



# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT GREAT GROUP UNIT NAME FLUVAQUENTS SANDY (Fa)  
STATE UTAH REPORT NO.        AUTHOR(S) MEQ DATE 3/77 REVISED    UNIT MODIFIER         
CLASSIFICATION AND BATTLE-SCENE DESCRIPTION       

THE FLUVAQUENTS ARE VERY DEEP SOMEWHAT POORLY AND POORLY DRAINED SOILS FORMED IN MIXED SANDY ALLUVIUM ON FLOOD PLAINS UNDER COTTONWOOD WIREGRASS AND WILLOWS. MAAT IS 48 TO 54F. AAP IS 12 TO 14 INCHES. FFP IS 150 TO 160 DAYS. THE PROFILE IS DOMINANTLY FINE SAND STRATIFIED WITH SILT LOAM AND FINE SANDY LOAM, OFTEN SOME GRAVEL AND COBBLE OCCURS. SLOPES ARE 0 TO 2 PERCENT.

FOOTNOTES			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE		UNIFIED		AASHO		FRACT. 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX	
								4	10	40	200			
0-60	SR-S-SIL		SM		A-2, A-4		0-5	80-100	75-95	50-70	25-45	15-25	NP-5	
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
	5-18	1.6-1.7	6.0-20	0.0-5-0.08	7.4-8.4	2-4	LOW	-	-	-	1-3	STEEL	CONCRETE	
SAME DEPTH AS ABOVE												HIGH	MODERATE	
FLOODING				HIGH WATER TABLE			CEMENTED PAV		BEDROCK		SLBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
RARE			1.0-4.0	APPARENT	APR-JUN	-		> 60		-		C	MODERATE	

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS		SEVERE: WETNESS		FILL	191	ROADFILL		POOR: WETNESS	
					2				
					3				
					4				
					5				
SEWAGE LAGOONS		SEVERE: FLOODS, SEEPAGE		SAND	201	SAND		POOR: EXCESS FINES	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)		SEVERE: WETNESS, SEEPAGE, TOO SANDY		GRAVEL	211	GRAVEL		UNSUITED	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)		SEVERE: WETNESS, SEEPAGE		SOIL	221	TOPSOIL		POOR: TOO SANDY	
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL		POOR: WETNESS, TOO SANDY				POND RESERVOIR AREA		SEEPAGE	
				PONDRS	231				
					2				
					3				
					4				
FOOTNOTES		BUILDING SITE DEVELOPMENT				EMBANKMENTS DIKES AND LEVEES		PIPING	
					5				
				DIKES	241				
					2				
					3				
SHALLOW EXCAVATIONS		SEVERE: WETNESS, CUTBANKS CAVE				EXCAVATED PONDS AQUIFER FED		FAVORABLE	
					4				
					5				
				PONDAQ	251				
					2				
DWELLINGS WITHOUT BASEMENTS		SEVERE: WETNESS, FLOODS				DRAINAGE		FLOODS, WETNESS, CUTBANKS CAVE	
					3				
					4				
					5				
				DRAIN	261				
DWELLINGS WITH BASEMENTS		SEVERE: FLOODS, WETNESS				IRRIGATION		FLOODS, WETNESS	
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS		SEVERE: WETNESS, FLOODS		IRRIG	271	TERRACES AND DIVERSIONS		PIPING, WETNESS	
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS		SEVERE: WETNESS		TERRAC	281	GRASSED WATERWAYS		WETNESS	
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW					
					2				
					3				
					4				
					5				

UNIT NAME FLUVAQUENTS RECREATIONAL DEVELOPMENT  
UNIT MODIFIER.

UNIT MODIFIER	FOOTNOTE	KEY NO ONLY	FOOTNOTE
CAMP AREAS	SEVERE: FLOODS, WETNESS, TOO SANDY	PLAYGROUNDS	SEVERE: FLOODS, WETNESS, TOO SANDY
		2	
		3	
		4	
		5	
PICNIC AREAS	SEVERE: FLOODS, WETNESS, TOO SANDY	PATHS AND TRAILS	SEVERE: WETNESS, TOO SANDY
		2	
		3	
		4	
		5	

[illegible][illegible][illegible][illegible]

FOOTNOTE		POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSFN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS - DETERMINING PHASE				
		ALL				
BEARDED WHEATGRASS	AGSU	5				
BLUE WILDERYE	ELGL	8				
BLUEGRASS	POA	10				
SEDGE	CAREX	5				
OTHER PERENNIAL GRASSES	PPGG	20				
OTHER PERENNIAL FORBS	PPEF	15				
BIG SAGEBRUSH	ARTR2	2				
BOXELDER	ACNE2	2				
NARROWLEAF COTTONWOOD	POAN3	13				
WILLOW	SALIX	8				
SALT CEDAR	TAPE	5				
OTHER SHRUBS	SSSS	7				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.)						
FAVORABLE YEARS		2500				
NORMAL YEARS						
UNFAVORABLE YEARS		1500				

[illegible]

# SOIL INTERPRETATIONS RECORD

MLRA(S)	35	KIND OF UNIT	GREAT GROUP	UNIT NAME	TORRIFLUENTS SANDY (Fa)
STATE	UTAH	RECORD NO.		AUTHOR(S)	MEO
		DATE	4/77	REVISED	
CLASSIFICATION AND BRIEF DESCRIPTION					

TORRIFLUENTS ARE VERY DEEP, WELL AND MODERATELY WELL DRAINED SOILS FORMED IN MIXED SANDY ALLUVIUM ON STREAM TERRACES AND FANS UNDER GALLETIA DROPSIED, BLUEGRASS AND SOME WILLOW. MAAT IS 48 TO 54 F. AAP IS 12 TO 14 INCHES. FFP IS 150 TO 160 DAYS. THE PROFILE IS DOMINANTLY SAND BUT STRATIFIED WITH LOAM, SILT LOAM AND FINE SANDY LOAM. SLOPES ARE 0 TO 4 PERCENT.

FOOTNOTES			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. - 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
0-60	SR-S-L	SM	A-2, A-4	0-5	95-100	90-100	60-75	25-50	15-25	NP-5				
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		W & D EROD. GROUP	ORGANIC MATTER PCT	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	5-10	1.6-1.7	6.0-20	0.05-0.08	7.4-8.4	2-4	LOW	.10	5	1	.5-1	HIGH	MODERATE	
FLOODING			HIGH WATER TABLE			CEMENTED PAV		BEDROCK		SUBSIDIENCE		HYD GRP	POTENTIAL FROST ACTION	
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL %			
NONE			48- 60	APPARENT	MAY-JUL	-		> 60			-		B	LOW

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL		
SEPTIC TANK ABSORPTION FIELDS		MODERATE: WETNESS		FILL	191	ROADFILL		GOOD:		
					2					
					3					
					4					
					5					
SEWAGE LAGOONS		SEVERE: SEEPAGE		SAND	201	SAND		POOR: EXCESS FINES		
					2					
					3					
					4					
					5					
SANITARY LANDFILL (TRENCH)		SEVERE: SEEPAGE, WETNESS		GRAVEL	211	GRAVEL		UNSUITED		
					2					
					3					
					4					
					5					
SANITARY LANDFILL (AREA)		SEVERE: SEEPAGE		SOIL	221	TOPSOIL		POOR: TOO SANDY		
					2					
					3					
					4					
					5					
DAILY COVER FOR LANDFILL		POOR: TOO SANDY		POND	231	POND RESERVOIR AREA		SEEPAGE		
										2
										3
										4
										5
FOOTNOTES		BUILDING SITE DEVELOPMENT				FOOTNOTES		WATER MANAGEMENT		
SHALLOW EXCAVATIONS		SLIGHT		DIKES	241	EMBANKMENTS DIKES AND LEVEES		PIPING		
					2					
					3					
					4					
					5					
DWELLINGS WITHOUT BASEMENTS		SLIGHT:		PONDAQ	251	EXCAVATED PONDS AQUIFER FEED		DEPTH TO WATER		
					2					
					3					
					4					
					5					
DWELLINGS WITH BASEMENTS		MODERATE: WETNESS		DRAIN	261	DRAINAGE		WETNESS		
					2					
					3					
					4					
					5					
SMALL COMMERCIAL BUILDINGS		SLIGHT:		IRRIG	271	IRRIGATION		DROUGHTY, FAST INTAKE		
					2					
					3					
					4					
					5					
LOCAL ROADS AND STREETS		SLIGHT		TERRAC	281	TERRACES AND DIVERSIONS		PIPING		
					2					
					3					
					4					
					5					
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRASED WATERWAYS		DROUGHTY		
					2					
					3					
					4					
					5					

[illegible]

COMMON PLANT NAME		PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE			
		ALL				
BLACK GRAMA	BOER4	3				
BLUE GRAMA	BOGR2	3				
GALLETA	HIJA	10				
INDIAN RICEGRASS	ORH4	10				
SAND DROPSEED	SPCR	5				
SPIKE DROPSEED	SPC04	10				
OTHER PERENNIAL GRASSES	PPGG	14				
OTHER PERENNIAL FORBS	PPFF	10				
BIG SAGEBRUSH	ARTR2	7				
FOURWING SALTBUSH	ARTCA2	7				
WINTERFAT	EULA5	5				
WILLOWS	SALIX	2				
OTHER SHRUBS	SSSS	14				
POTENTIAL PRODUCTION (LBS./AC. DRY WT)						
FAVORABLE YEARS		1000				
NORMAL YEARS						
UNFAVORABLE YEARS		500				

GaA     Ga silty clay loam, 0 to 2 percent slopes

This soil is very deep and well drained. It occurs in alluvial valleys at elevations of 5,200 to 5,800 feet. This soil formed in alluvium derived mainly from shale, but includes some sandstone. Average annual precipitation is 12 to 14 inches. Mean annual air temperature is 48° to 50° F., and the frost-free season is 140 to 160 days. Natural vegetation is dominantly squirreltail, basin wildrye, bluebunch wheatgrass, Indian ricegrass, big sagebrush and rubber rabbitbrush.

The soil occurs mainly in Johnson Wash Area.

Included with this soil in mapping are small areas of Ha silt loam, 0 to 4 percent slopes.

In a typical profile the surface layer is brown silty clay loam about 9 inches thick. The underlying layer is pale brown silty clay loam about 5 inches thick. The next layer is brown clay loam about 10 inches thick. The next underlying layer is pale brown silty clay about 22 inches thick. This is underlain by light yellowish brown loamy fine sand to a depth of 60 inches or more.

Permeability is slow. Available water capacity is 8 to 10 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is low, about 1.5 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 24 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .37 in the upper 24 inches and .28 below 24 inches. The Soil Surface Factor (SSF) is 24.

This soil is used for rangeland, irrigated cropland and wildlife habitat.

A representative profile of Ga silty clay loam, 0 to 2 percent slopes about 1,350 feet east and 100 feet south of the northwest corner of section 11, T. 42 S., R. 5 W. in a cultivated area follows:

A11--0 to 4 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) when moist; weak coarse prismatic structure that parts to moderate fine granular; slightly hard, friable, sticky, slightly plastic; few very fine and fine roots; strongly calcareous, lime is disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary.

A12--4 to 9 inches; brown (10YR 5/3) silty clay loam, brown or dark brown (10YR 4/3) when moist; weak, coarse and moderate fine subangular blocky structure; hard, firm, sticky, slightly plastic; few very fine and fine roots; common very fine and fine pores; strongly calcareous, lime is disseminated; moderately alkaline (pH 8.4); abrupt smooth boundary.

C1--9 to 14 inches; pale brown (10YR 6/3) silty clay loam, brown or dark brown (10YR 4/3) when moist; moderate, medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few very fine roots; and fine, few medium pores; strongly calcareous, lime is disseminated; moderately alkaline (pH 8.4); clear smooth boundary.

C2--14 to 24 inches; brown (10YR 5/3) clay loam, brown or dark brown (10YR 4/3) when moist; moderate, medium prismatic structure that parts to moderate medium subangular blocky; hard, firm, slightly sticky, slightly plastic; few very fine roots; many very fine, and fine, common coarse pores; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.5); gradual smooth boundary.

C3--24 to 34 inches; pale brown (10YR 6/3) silty clay, brown or dark brown (10YR 4/3) when moist; weak, medium prismatic structure that parts to moderate medium subangular blocky; hard, firm, sticky, plastic; few very fine roots; common very fine and fine, and few medium pores; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.5); gradual wavy boundary.

C4--34 to 46 inches; pale brown (10YR 6/3) silty clay, brown or dark brown (10YR 4/3) when moist; moderate, medium prismatic structure that parts to moderate medium subangular blocky; hard, firm, sticky, plastic; few very fine and fine roots; common very fine and fine few medium pores; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.7); clear wavy boundary.

C5--46 to 74 inches; light yellowish brown (10YR 6/4) loamy fine sand, dark yellowish brown (10YR 4/4) when moist; single grain; loose, very friable, nonsticky, nonplastic; few very fine roots; few fine and medium pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.8).

The A1 has hue of 10YR, value is 5 or 6 dry, 3 through 5 moist and chroma of 2 through 4. It is dominantly silty clay loam, but ranges to silty clay or clay loam in places. The A1 horizon is commonly highly stratified with layers of silty clay loam, loam, clay loam, fine sandy loam and loamy fine sand in many profiles. This soil is moderately to strongly calcareous throughout the profile.

Soil suitability for range seeding is good. Plant species generally recommended for seeding are crested wheatgrass, Siberian wheatgrass, or Indian ricegrass. Other plant species that grow well in areas with 12 to 14 inches precipitation can be used. Equipment limitations are slight.



GaA Landscape view of Ga silty clay loam, 0 to 2 percent slopes in Johnson Wash. The vegetation is dominantly Rubber rabbit-brush, big sagebrush, squirreltail, basin wildrye, bluebunch wheatgrass and Indian ricegrass.

Profile of Ga silty clay loam, 0 to 2 percent slopes. A1 horizon about 9 inches thick, C horizon below. Classification is fine-loamy, mixed (calcareous) mesic Ustic Torrifuvents.







UNIT NAME: Ga \_\_\_\_\_ RECREATIONAL DEVELOPMENT  
UNIT MODIFIER: \_\_\_\_\_

FOOTNOTE		KEYING ONLY		FOOTNOTE	
CAMP AREAS	MODERATE; TOO CLAYEY	PLAYGR	321	PLAYGROUNDS	MODERATE: TOO CLAYEY
			2		
			3		
			4		
			5		
PICNIC AREAS	MODERATE: TOO CLAYEY	PATHS	331	PATHS AND TRAILS	MODERATE: TOO CLAYEY
			2		
			3		
			4		
			5		

[illegible][illegible][illegible][illegible]

FOOTNOTE		POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE				
		ALL				
BLUEBUNCH WHEATGRASS	AGSP	30				
GALLETA	HIJA	7				
INDIAN RICEGRASS	ORHY	12				
NEVADA BLUEGRASS	PONE3	10				
WESTERN WHEATGRASS	AGSM	7				
OTHER PERENNIAL GRASSES	PPGG	9				
MEADOW MILKVETCH	ASDI5	1				
TAPERTIP HAWKSBEARD	CRAC2	1				
OTHER PERENNIAL FORBS	PPFF	3				
ANTELOPE BITTERBRUSH	PUTR2	3				
BIG SAGEBRUSH	ARTR2	5				
PRICKLYPEAR 27	OPUNT	3				
LANCELEAF YELLOWBRUSH	CHVIL	5				
OTHER SHRUBS	SSSS	4				
POTENTIAL PRODUCTION (LBS./AC. DRY WT):						
FAVORABLE YEARS		1400				
NORMAL YEARS						
UNFAVORABLE YEARS		700				

## FOOTNOTES

A	ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH
1	SLOW PERMEABILITY ABOVE 46 INCHES, RAPID PERMEABILITY BELOW 46 INCHES
2	NOT USUALLY UTILIZED BY SHEEP AND CATTLE

HaB    Ha silt loam, 0 to 4 percent slopes

This soil is a very deep and somewhat excessively drained. It occurs in alluvial valleys at elevations of 5,400 to 6,000 feet. This soil formed in alluvium derived from sandstone and siltstone. Average annual precipitation is 12 to 14 inches. Mean annual air temperature is 48° to 52°F and the frost-free season is 140 to 160 days. Natural vegetation is dominantly galleta, globemallow, Indian ricegrass, big sagebrush and Gambel oak.

This soil occurs mainly in the Johnson Wash area.

Included with this soil in mapping are areas that have a loamy fine sand surface layer; small areas of Ga silty clay loam, 0 to 2 percent slopes; small areas of Ma fine sand, 4 to 12 percent slopes; and small areas of Me sand, 2 to 10 percent slopes.

In a typical profile the surface layer is yellowish brown silt loam, about 3 inches thick. The underlying layer is yellowish brown loamy fine sand about 18 inches thick. The next layer is very pale brown fine sand, stratified with fine sandy loam to a depth of 60 inches or more.

Permeability is rapid. Available water capacity is 4 to 5 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is low, about 1.5 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 20 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .43 in the upper 3 inches and .17 below 3 inches. The Soil Surface Factor (SSF) is 26.

This soil is used for rangeland and wildlife habitat.

A representative profile of Ha silt loam, 0 to 4 percent about 2,300 feet west and 1,200 feet south of the northeast corner of section 35, T. 41 S., R. 5 W. in a rangeland area follows:

A11--0 to 1 inch; yellowish brown (10YR 5/4) silt loam, dark brown (10YR 3/3) when moist; weak, medium platy structure that parts to single grain; loose, friable, slightly sticky, nonplastic; few very fine and fine roots; many very fine and fine and few medium pores; strongly calcareous, lime is disseminated; moderately alkaline (pH 8.1); abrupt smooth boundary.

A12--1 to 3 inches; light yellowish brown (10YR 6/4) silt loam, brown or dark brown (10YR 4/3) when moist; weak, coarse angular blocky structure that parts to weak thick platy; soft, friable, sticky, nonplastic; common

very fine, few fine roots; many very fine and fine, common medium, few coarse pores; strongly calcareous, lime is disseminated; moderately alkaline (pH 8.3); clear, smooth boundary.

C1--3 to 21 inches; yellowish brown (10YR 5/4) loamy fine sand, brown or dark brown (10YR 4/3) when moist; single grain; loose, very friable, slightly sticky, nonplastic; few very fine, fine and medium roots; common very fine and fine, and few medium and coarse pores; moderately calcareous, lime is disseminated; moderately alkaline (pH 8.4); gradual, wavy boundary.

C2--21 to 34 inches; very pale brown (10YR 7/4) fine sand, light yellowish brown (10YR 6/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; common very fine, few fine and medium pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.7); clear, wavy boundary.

C3--34 to 64 inches; very pale brown (10YR 7/4) fine sand, light yellowish brown (10YR 6/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; few very fine and fine pores; 2 percent gravel, 1 percent cobble; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.7); abrupt wavy boundary.

C4--64 to 66 inches; light yellowish brown (10YR 6/4) fine sandy loam, yellowish brown (10YR 5/4) when moist; massive; loose, nonsticky, nonplastic; few very fine roots; common very fine, few fine and medium pores; strongly calcareous, lime is disseminated; strongly alkaline (pH 8.6); abrupt, smooth boundary.

C5--66 to 77 inches; very pale brown (10YR 7/4) fine sand, light yellowish brown (10YR 6/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine roots; few fine and medium pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 9.0).

The surface layer texture of this soil is highly variable ranging from silt loam to loamy fine sand, particularly near the mouth of canyons and drainageways. The A1 horizon has hue of 10YR, value of 5 or 6 dry, 3 or 4 moist, and chroma of 3 or 4. The C horizon is stratified with individual layers of silt loam, fine sandy loam, loamy fine sand and fine sand occurring in most areas. It is moderately to strongly calcareous throughout.

Soil suitability for range seeding is fair. The limiting factors are moderately low water holding capacity of the soil and only 12 to 14 inches of precipitation. Plant species generally recommended for seeding are crested wheatgrass, Siberian wheatgrass or Indian ricegrass. Other plant species that grow well in areas with 12 to 14 inches precipitation can be used. Equipment Limitations are moderate due to the sandy soils.



HaB Landscape view of Ha silt loam, 0 to 4 percent slopes. The vegetation is dominantly big sagebrush, galleta, globemallow, Indian ricegrass, and rubber rabbitbrush.



# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Ha silt loam (HAB)  
 STATE UTAH RECORD NO.          AUTHOR(S) VLM DATE 4/77 REVISED    UNIT MODIFIER           
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION         

THE Ha SERIES ARE VERY DEEP, SOMEWHAT EXCESSIVELY DRAINED SOILS FORMED IN ALLUVIUM FROM SANDSTONE AND SILTSTONE ON LEVEL TO GENTLY SLOPING VALLEYS UNDER INDIAN RICEGRASS, DROPSEED, BIG SAGEBRUSH AND OAK. MAAT IS 48 TO 52 F. AAP IS 12 TO 14 INCHES. FFP IS 140 TO 160 DAYS. A TYPICAL PROFILE HAS A YELLOWISH BROWN SILT LOAM SURFACE ABOUT 3 INCHES THICK. THE UNDERLYING LAYER IS YELLOWISH BROWN LOAMY FINE SAND ABOUT 18 INCHES THICK. THE NEXT LAYER IS VERY PALE BROWN FINE SAND TO 60 INCHES. SLOPES ARE 0 TO 4 PERCENT.

FOOTNOTE		ESTIMATED SOIL PROPERTIES								
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. + 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX
					4	10	40	200		
0-3	SIL	ML, CL-ML	A-4	0	100	100	80-100	65-85	25-30	NP-10
3-60	LFS, FS	SM	A-2	0	100	100	50-95	15-35	20-25	NP-5

DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS K T	WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
											STEEL	CONCRETE
	12-18	1.5-1.7	2.0-6.0	0.16-0.18	7.9-8.4	<2	LOW	.43 5	4L	1-3	HIGH	MODERATE
	5-10	1.5-1.7	6.0-20	0.07-0.09	7.9-9.0	<2	LOW	.17				
SAME DEPTH AS ABOVE												

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			> 6.0					> 60				A	LOW

FOOTNOTES		SANITARY FACILITIES		KEYINGS ONLY	FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SLIGHT:			FILL 191			GOOD:	
				2				
				3				
				4				
				5				
SEWAGE LAGOONS	SEVERE: SEEPAGE			SAND 201			POOR: EXCESS FINES	
				2				
				3				
				4				
				5				
SANITARY LANDFILL (TRENCH)	SEVERE: SEEPAGE, TOO SANDY			GRAVEL 211			UNSUITED	
				2				
				3				
				4				
				5				
SANITARY LANDFILL (AREA)	SEVERE: SEEPAGE			SOIL 221			FAIR: TOO SANDY	
				2				
				3				
				4				
				5				

DAILY COVER FOR LANDFILL	POOR: TOO SANDY, SEEPAGE			PONDERS 231			FOOTNOTES	WATER MANAGEMENT
				2				
				3				
				4				
				5				
SHALLOW EXCAVATIONS	SEVERE: CUTBANKS CAVE			DYES 241				PIPING, SEEPAGE
				2				
				3				
				4				
				5				
DWELLINGS WITHOUT BASEMENTS	SLIGHT:			PONCAQ 251				NO WATER
				2				
				3				
				4				
				5				
DWELLINGS WITH BASEMENTS	SLIGHT:			DRAIN 261				NOT NEEDED
				2				
				3				
				4				
				5				
SMALL COMMERCIAL BUILDINGS	SLIGHT:			IRP/G 271				DROUGHTY
				2				
				3				
				4				
				5				
LOCAL ROADS AND STREETS	SLIGHT:			TEPPAC 281				SLOPE, TOO SANDY
				2				
				3				
				4				
				5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW 291				DROUGHTY
				2				
				3				
				4				
				5				

FOOTNOTES	REGIONAL INTERPRETATIONS	

UNIT NAME: Ha RECREATIONAL DEVELOPMENT  
UNIT MODIFIER:

UNIT MODIFIER:		FOOTNOTE		KEYING ONLY		FOOTNOTE	
CAMP AREAS	MODERATE: DUSTY	PLAY-3	321	PLAYGROUNDS	MODERATE: DUSTY		
			2				
			3				
			4				
			5				
PICNIC AREAS	MODERATE: DUSTY	PAT-5	331	PATHS AND TRAILS	MODERATE: DUSTY		
			2				
			3				
			4				
			5				

[illegible][illegible][illegible][illegible]

FOOTNOTE		POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE				
		ALL				
BLACK GRAMA	BOER4	3				
INDIAN RICEGRASS	ORHY	12				
NEEDLEANDTHREAD	STC04	5				
SAND DROPSEED	SPCR	5				
SIDEOATS GRAMA	BOCU	5				
SPIKE DROPSEED	SPC04	10				
OTHER PERENNIAL GRASSES	PPGG	15				
STICKSEED	LAPPU	2				
OTHER PERENNIAL FORBS	PPFF	8				
BIG SAGEBRUSH	ARTR2	7				
FOURWING SALTBUSH	ATCA 2	7				
GAMBEL OAK	QUGA	5				
GREENLEAF MANZANITA 1/	ARPA6	5				
WINTERFAT	EULA5	5				
OTHER SHRUBS	SSSS	6				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.)						
FAVORABLE YEARS		1000				
NORMAL YEARS						
UNFAVORABLE YEARS		500				

[illegible]

JaC     Ja fine sandy loam, 2 to 8 percent slopes

This soil is very deep and well drained. It occurs in alluvial valleys at elevations of 6,300 to 7,000 feet. This soil formed in alluvium derived mainly from sandstone. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 120 to 140 days. Natural vegetation is dominantly western wheatgrass, Indian ricegrass, bluebunch wheatgrass, blue grama, mustard, big sagebrush, yellow brush and Utah juniper.

This soil occurs mainly on Glendale Bench.

Included with this soil in mapping are small areas of Ba very fine sandy loam, 4 to 15 percent slopes; small areas of Sa very fine sandy loam, 2 to 4 percent slopes; small areas of La very fine sandy loam, 2 to 4 percent slopes; and small areas of fine sandy loam soil that is 10 to 20 inches over limestone bedrock.

In a typical profile the surface layer is brown or dark brown fine sandy loam about 24 inches thick. The subsoil is dark brown and reddish brown, fine sandy loam about 28 inches thick. The substratum is reddish brown, fine sandy loam, to a depth of 60 inches or more.

Permeability is moderately rapid. Available water capacity is 6.5 to 8.0 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is low, about 1.5 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 30 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .17 throughout the profile. The Soil Surface Factor (SSF) is 23.

This soil is used for rangeland and wildlife habitat.

A representative profile of Ja fine sandy loam, 2 to 8 percent slopes, about 2,700 feet south and 500 feet east of the northwest corner of section 6, 41 S., R. 6 W. in a rangeland area follows:

A11--0 to 4 inches; brown or dark brown (10YR 4/3) fine sandy loam, very dark grayish brown (10YR 3/2) when moist; weak, coarse subangular blocky structure; loose, very friable, nonsticky, nonplastic; many very fine, common fine roots; slightly acid, (pH 6.5); clear, wavy boundary.

A12--4 to 13 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) when moist; moderate, coarse thick platy structure that parts to weak fine granular; soft, very friable, nonsticky, nonplastic; few very fine, fine, and medium roots; few very fine and medium, common fine pores; neutral (pH 6.7); clear smooth boundary.

A13--13 to 24 inches; brown or dark brown (7.5YR 4/2) fine sandy loam, dark brown (7.5YR 3/2) when moist; weak, medium subangular blocky structure that parts to weak fine granular; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; few very fine, fine and medium pores; neutral (pH 6.9); gradual, smooth boundary.

B21t--24 to 32 inches; brown or dark brown (7.5YR 4/2) heavy fine sandy loam, dark brown (7.5YR 3/2) when moist; moderate, medium subangular blocky structure; hard, friable, nonsticky, nonplastic; few very fine and fine roots; few very fine and fine pores; few thin clay films in root channels and on peds; extensive cicada activity; neutral (pH 6.8); gradual smooth boundary.

B22t--32 to 52 inches; reddish brown (5YR 4/4) heavy fine sandy loam, dark reddish brown (5YR 3/3) when moist; moderate, medium subangular blocky structure; hard, friable, nonsticky, nonplastic; few very fine, few fine roots; few fine pores; few thin clay films on faces of peds; extensively worked by cicada; neutral (pH 6.7); abrupt smooth boundary.

B3--52 to 60 inches; reddish brown (5YR 5/3) fine sandy loam, reddish brown (5YR 4/3) when moist; weak, medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; few fine pores; neutral (pH 6.9).

The dark colored surface layer is 17 to 44 inches thick. The A1 horizon has hue of 10YR or 7.5YR value of 4 or 5 dry and 3 moist and chroma of 2 or 3. It is dominantly fine sandy loam but may range to loamy fine sand in the upper 2 to 4 inches. The A1 horizon is 17 to 36 inches thick. The B2t horizon has hue of 7.5YR or 5YR, value of 4 or 5 dry, 3 or 4 moist and chroma of 2 to 6. It is fine sandy loam but is marginal to sandy clay loam in some pedons. Clay films are few, thin to continuous. In many places, the soil profile has been extensively worked by cicada.

Soil suitability for range seeding is good. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Tobar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 16 inches precipitation can be used. Equipment limitations are slight.



JaC Landscape view of Ja fine sandy loam, 2 to 8 percent slopes. The vegetation is dominantly big sagebrush, western wheatgrass, Indian ricegrass, bluebunch wheatgrass, blue grama, and yellowbrush.





	FOOTNOTES
A	ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH.

KVH    Lithic Ustorthents-Lithic Haploborolls-Rock outcrop complex.

This mapping unit is a complex. It occurs on the cuesta scarp locally known as the White Cliffs. It consists of about 40 percent loamy-skeletal, mixed, (calcareous) mesic Lithic Ustorthents, 40 to 80 percent slopes; about 30 percent loamy-skeletal, mixed, Lithic Haploborolls, 40 to 60 percent slopes, and about 20 percent Rock outcrop and 10 percent other soils.

Included within this complex in mapping are small areas of Ka fine sandy loam, 15 to 40 percent slopes; small areas of Mb fine sand, 2 to 4 percent slopes; and small areas of Me sand, 10 to 30 percent slopes.

These soils occur in a complex pattern with the Lithic Ustorthent soils occurring on south, east and west facing slopes, while the Lithic Haploboroll soils occurs dominantly on north facing slopes, while the Lithic Haploboroll soils occur dominantly on north facing slopes. Both soils of the complex formed in the Carmel formation above the nearly vertical Rock outcrop cliffs of the Navajo formation.

This complex occurs mainly on the steep breaks on the south rim of Skutumpah Terrace.

Natural vegetation is Indian ricegrass, pinyon pine, Utah juniper, serviceberry, manzanita and Mormon tea. Elevations range from 6,400 to 7,200 feet. Average annual precipitation is 14 to 16 inches.

The loamy-skeletal, mixed, (calcareous) mesic Lithic Ustorthents is very shallow and somewhat excessively drained. It occurs on very steep mountain slopes above nearly vertical escarpments. It formed in residuum from limestone and sandstone. Mean annual air temperature is 46° to 48° F., and the frost-free season is 130 to 150 days.

In a typical profile the surface layer is pale brown, gravelly loam about 3 inches thick. The underlying layer is brown, very gravelly loam about 3 inches thick underlain by fractured limestone bedrock.

Permeability is moderately rapid. Runoff is rapid and the erosion hazard is high. The available water holding capacity is less than 1 inch to the bedrock

A representative profile of the loamy skeletal, mixed, (calcareous) mesic Lithic Ustorthent, about 1,400 feet north of the southeast corner of section 7, T. 41 S., R. 6 W. in a wildlife area follows:

Al--0 to 3 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; weak, fine granular structure; slightly hard, firm, sticky, plastic; few very fine and fine roots; 20 percent gravel, 10 percent channery fragments; strongly calcareous; lime is disseminated; moderately alkaline (pH 8.0); clear smooth boundary.

C1--3 to 6 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 5/3) moist; massive; soft, firm, sticky, plastic; plentiful very fine, few fine and medium roots; 90 percent gravel, 5 percent channery fragments; strongly calcareous, lime is disseminated; moderately alkaline (pH 8.2); clear smooth boundary.

R--6 to 11 inches; fractured calcareous limestone bedrock.

Depth to the bedrock ranges from 5 to 15 inches. The A1 horizon ranges from 10 to 25 percent gravel and 10 to 20 percent channery fragments. The C horizon ranges from 10 to 60 percent gravel and 5 to 30 percent channery fragments and averages over 50 percent.

The loamy-skeletal, mixed Lithic Haploborolls is shallow and somewhat excessively drained. It occurs on very steep mountain slopes, dominantly north and east facing. This soil formed in residuum and colluvium derived from limestone and sandstone. Slopes are 40 to 60 percent. Mean annual air temperature is 43° to 45°F. and the frost free season is 110 to 140 days.

In a typical profile the surface layer is dark brown, cobbly loam, about 9 inches thick. The underlying layer is light gray cobbly loam over calcareous sandstone or limestone at depths of about 14 inches.

The texture of the surface layer ranges from cobbly loam to channery fine sandy loam or to very channery sandy loam.

Permeability is moderately rapid. Runoff is rapid and erosion hazard is high. The available water holding capacity is 1 to 1.5 inches above the bedrock.

The Rock outcrop consists of barren or nearly barren exposures of limestone or sandstone.

This complex is used for rangeland and wildlife habitat.

Soil suitability for range seeding is very poor because of the shallow soils and very low water holding capacity and the very steep slopes. Equipment limitation is severe because of the cobbly shallow soils and very steep slopes.



KVH Landscape view of mapping unit KVH--Lithic Ustorthents - Lithic Haploborolls - Rock outcrop complex. Slope is 40 to 80 percent. The vegetation is dominantly pinyon pine, Utah juniper, Indian ricegrass, seviceberry, manzanita, and occassional ponderosa pine.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT FAMILY UNIT NAME LITHIC USTORTHERENTS (KVI)  
 STATE UTAH RECORD NO.  AUTHOR(S) VLM DATE 4/77 REVISED  UNIT MODIFIER loamy-skeletal, mixed, (calcareous) mesic  
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE LITHIC USTORTHERENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), MESIC, FAMILY CONSISTS OF VERY SHALLOW SOMEWHAT EXCESSIVELY DRAINED SOILS FORMED IN RESIDUUM FROM LIMESTONE ON VERY STEEP MOUNTAIN SLOPES UNDER INDIAN RICEGRASS, SERVICEBERRY, PINYON PINE AND JUNIPER. MAAT IS 46 TO 48 F, AAP IS 14 TO 16 INCHES, FFP IS 130 TO 150 DAYS, THE SURFACE LAYER IS RALE BROWN, GRAVELLY LOAM ABOUT 3 INCHES THICK, THE UNDERLYING LAYER IS BROWN VERY GRAVELLY LOAM ABOUT 3 INCHES THICK OVER BEDROCK. SLOPES ARE 40 TO 80 PERCENT.

FOOTNOTES			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE		UNIFIED		AASHO		FRACT. + 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX	
								4	10	40	200			
0-6	GR-L, GRV-L		SM-SC, GM-GC		A-2		5-30	60-70	40-60	35-50	20-35	25-30	5-10	
6	UWB													
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	15-25	1.6-1.7	2.0-6.0	0.05-0.08	7.9-8.4	<2	LOW	.24	1	8	1-2	HIGH	MODERATE	
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			>6.0				-		5-15	HARD	-		D	LOW

SANITARY FACILITIES				KEYING ONLY		CONSTRUCTION MATERIAL			
FOOTNOTES	SEVERE: DEPTH TO ROCK, SLOPE			FILL	191	ROADFILL	POOR: THIN LAYER, SLOPE, AREA RECLAIM		
SEPTIC TANK ABSORPTION FIELDS					2				
					3				
					4				
					5				
SEWAGE LAGOONS	SEVERE: SEEPAGE, DEPTH TO ROCK, SLOPE			SAND	201	SAND	UNSUITED		
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)	SEVERE: DEPTH TO ROCK, SEEPAGE, SLOPE			GRAVEL	211	GRAVEL	UNSUITED:		
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)	SEVERE: SEEPAGE, SLOPE			SOIL	221	TOPSOIL	POOR: SMALL STONES, THIN LAYER, SLOPE		
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL	POOR: THIN LAYER, SMALL STONES, SLOPE								
				PONDRS	231	POND RESERVOIR AREA	SEEPAGE, DEPTH TO ROCK, SLOPE		
					2				
					3				
					4				
					5				
BUILDING SITE DEVELOPMENT									
FOOTNOTES	SEVERE: DEPTH TO ROCK, SLOPE			DIKES	241	EMBANKMENTS DIKES AND LEVEES	THIN LAYER, SEEPAGE		
SHALLOW EXCAVATIONS					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS	SEVERE: SLOPE, DEPTH TO ROCK			PONDAQ	251	EXCAVATED PONDS AQUIFER FED	NO WATER		
					2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS	SEVERE: DEPTH TO ROCK, SLOPE			DRAIN	261	DRAINAGE	NOT NEEDED		
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE, DEPTH TO ROCK			IRPIG	271	IRRIGATION	DROUGHTY, ROOTING DEPTH, SLOPE		
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS	SEVERE: DEPTH TO ROCK, SLOPE			TERRAC	281	TERRACES AND DIVERSIONS	SLOPE, DEPTH TO ROCK		
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRAZED WATERWAYS	SLOPE, DROUGHTY, ROOTING DEPTH		
					2				
					3				
					4				
					5				

FOOTNOTES	REGIONAL INTERPRETATIONS

UNIT NAME LITHIC USTORTHERTS RECREATIONAL DEVELOPMENT  
UNIT MODIFIER LOAMY SKELETAL MIXED (CALC) MESIC

CAMP MODIFIER: LOAM, SKELETON, MIXED, (CAEC) RESIDUE		KEYING ONLY		FOOTNOTE	
CAMP AREAS	SEVERE: SLOPE, DEPTH TO ROCK	PLAYGRO	321	PLAYGROUNDS	SEVERE: SLOPE, SMALL STONES, DEPTH TO ROCK
			2		
			3		
			4		
			5		
PICNIC AREAS	SEVERE: SLOPE	PATHS	331	PATHS AND TRAILS	SEVERE: SLOPE
			2		
			3		
			4		
			5		

[illegible][illegible][illegible][illegible]

FOOTNOTE		POTENTIAL NATIVE PLANT COMMUNITY (RANGE LAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE				
		ALL				
BLUE GRAMA	BOGR2	5				
DRYLAND SEDGE	CAREX	8				
INDIAN RICEGRASS	ORHY	8				
NEEDLEANDTHREAD	STCO4	5				
OTHER PERENNIAL GRASSES	PPGG	24				
OTHER PERENNIAL FORBS	PPFF	5				
ANTELOPE SITTERBRUSH	PUTR2	5				
BIG SAGEBRUSH	ARTR2	5				
BLACK SAGEBRUSH	ARARN	5				
MANZANITA	ARPA6	5				
MORMON TEA	EPHE0	5				
SERVICEBERRY	AMAL2	5				
PINYON 1/	PIED	5				
UTAH JUNIPER 1/	JUOS	5				
OTHER SHRUBS	SSSS	5				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.):						
FAVORABLE YEARS		1200				
NORMAL YEARS						
UNFAVORABLE YEARS		500				

[illegible]

# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT FAMILY UNIT NAME LITHIC HAPLOBOROLLS (KVH)  
STATE UTAH RECORD NO. AUTHOR(S) MEO DATE 4/77 REVISED UNIT MODIFIER loamy-skeletal, mixed  
CLASSIFICATION AND BRIEF DESCRIPTION

THE LITHIC HAPLOBOROLLS LOAMY SKELETAL, MIXED FAMILY CONSISTS OF SHALLOW SOMEWHAT EXCESSIVELY DRAINED SOILS FORMED IN RESIDUUM AND COLLUVIUM FROM LIMESTONE AND SANDSTONE ON VERY STEEP MOUNTAIN SLOPES UNDER GRAMA, INDIAN RICEGRASS, MANZANITA AND MORMON TEA. MAAT IS 43 TO 45 F, AAP IS 14 TO 16 INCHES. FFS IS 110 TO 140 DAYS. A TYPICAL PEDON HAS A DARK BROWN COBBLY LOAM SURFACE 14 INCHES THICK OVER BEDROCK. SLOPES ARE 40 TO 60 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
0-14	CB-L	GM-GC	A-2, A-4	20-30	55-65	50-60	40-50	30-40	25-30	5-10				
14	UWB													
DEPTH (IN)	CLAY (PCT DF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER PCT.	CORROSION		
								K	T			STEEL	CONCRETE	
	15-25	1.6-1.7	2.0-6.0	0.06-0.08	7.4-8.4	<2	LOW	.24	1	8	1-3	HIGH	MODERATE	
SAME DEPTH AS ABOVE														
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			> 6.0			-		10-15	HARD	-		0	LOW	

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SEVERE: DEPTH TO ROCK, SLOPE	FILL	191	ROADFILL	POOR: THIN LAYER, SLOPE, AREA RECLAIM				
			2						
			3						
			4						
			5						
SEWAGE LAGOONS	SEVERE: SEEPAGE, DEPTH TO ROCK, SLOPE	SAND	201	SAND	UNSUITED				
			2						
			3						
			4						
			5						
SANITARY LANDFILL (TRENCH)	SEVERE: DEPTH TO ROCK, SEEPAGE, SLOPE	GRAVEL	211	GRAVEL	UNSUITED				
			2						
			3						
			4						
			5						
SANITARY LANDFILL (AREA)	SEVERE: SEEPAGE, SLOPE	SOIL	221	TOPSOIL	POOR: SLOPE, LARGE STONES				
			2						
			3						
			4						
			5						
DAILY COVER FOR LANDFILL	POOR: THIN LAYER, SLOPE, LARGE STONES			FOOTNOTES	WATER MANAGEMENT				
		PDNDRS	231			PDND RESERVOIR AREA	SEEPAGE, DEPTH TO ROCK, SLOPE		
			2						
			3						
			4						
FOOTNOTES	BUILDING SITE DEVELOPMENT			5	EMBANKMENTS DIKES AND LEEVEES		THIN LAYER, SEEPAGE		
		SHALLOW EXCAVATIONS	SEVERE: SLOPE, DEPTH TO ROCK			DIKES	241		
							2		
							3		
							4		
			5						
DWELLINGS WITHOUT BASEMENTS	SEVERE: SLOPE, DEPTH TO ROCK	PDND AQ	251	EXCAVATED PDNDS AQUIFER FED	NO WATER				
			2						
			3						
			4						
			5						
DWELLINGS WITH BASEMENTS	SEVERE: SLOPE, DEPTH TO ROCK	DRAIN	261	DRAINAGE	NOT NEEDED				
			2						
			3						
			4						
			5						
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE, DEPTH TO ROCK	IRRIG	271	IRRIGATION	SLOPE, ROOTING DEPTH, DROUGHTY				
			2						
			3						
			4						
			5						
LOCAL ROADS AND STREETS	SEVERE: SLOPE, DEPTH TO ROCK	TERRAC	281	TERRACES AND DIVERSIONS	SLOPE, DEPTH TO ROCK				
			2						
			3						
			4						
			5						
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS		WATERW		GRASED WATERWAYS	SLOPE, DROUGHTY, ROOTING DEPTH				
			2						
			3						
			4						
			5						

CAMP/ROAD/AREA		SEVERITY		REMARKS ONLY		FOOTNOTE	
CAMP AREAS	SEVERE: SLOPE	PLAYGRO	321	PLAYGROUNDS	SEVERE: SLOPE, LARGE STONE, DEPTH TO ROCK		
			2				
			3				
			4				
			5				
PICKUP AREAS	SEVERE: SLOPE	PATHS	331	PATHS AND TRAILS	SEVERE: SLOPE		
			2				
			3				
			4				
			5				

## CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

[illegible]

## WOODLAND SUITABILITY

[illegible]

## WIND BREAKS

[illegible]

## WILDLIFE HABITAT SUITABILITY

[illegible]

POTENTIAL NATIVE PLANT COMMUNITY: RANGELAND OR FOREST UNDERSTORY VEGETATION

COMMON PLANT NAME		PLANT SYMBOL (NLSFN)	PERCENTAGE COMPOSITION - DRY WEIGHT BY CLASS - DETERMINED PHASE			
		ALL				
BLUE GRAMA		BOGR2	5			
DRYLAND SEDGE		CAREX	8			
INDIAN RICEGRASS		ORHY	8			
NEEDLEANDTHREAD		STCO4	5			
OTHER PERENNIAL GRASSES		PPGG	24			
OTHER PERENNIAL FORBS		PPFF	5			
ANTELOPE BITTERBRUSH		PUTR2	5			
SIG SAGEBRUSH		ARTR2	5			
BLACK SAGEBRUSH		ARARN	5			
GREENLEAF MANZANITA		ARPA6	5			
MORMON TEA		EPHE0	5			
SERVICEBERRY		AMAL2	5			
PINYON 1/	1/	PIED	5			
UTAH JUNIPER		JUOS	5			
OTHER SHRUBS		SSSS	5			
POTENTIAL PRODUCTION (LBS./AC. DRY WT.):						
FAVORABLE YEARS			1200			
NORMAL YEARS						
UNFAVORABLE YEARS			500			

## FOOTNOTES

NOT USUALLY UTILIZED BY SHEEP AND CATTLE

MaD     Ma fine sand, 4 to 12 percent slopes

This soil is very deep and excessively drained. It occurs on alluvial fans and toeslopes at elevations of 5,500 to 6,200 feet. This soil formed in alluvium and colluvium derived mainly from the white cliff member of the Navajo sandstone. Average annual precipitation is 12 to 14 inches. Mean annual air temperature is 48° to 52° F., and the frost-free season is 140 to 160 days. Natural vegetation is dominantly Indian ricegrass, pугent muhly, galleta, Indian paintbrush, big sagebrush, yellowbrush, Gambel oak Utah juniper and pinyon pine.

This soil occurs around the lower edge of the white cliffs.

Included with this soil in mapping are small areas of Me sand, 2 to 10 percent slopes; small areas of Ha silt loam, 0 to .4 percent slopes; Rock outcrop and Sand dunes.

In a typical profile the surface layer is pale brown and light yellowish brown, fine sand about 16 inches thick. The underlying layer is very pale brown, or light yellowish brown, fine sand to a depth of 60 inches or more.

Permeability is very rapid. Available water capacity is 3.0 to 5.0 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 16 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. Wind erosion is a problem on this sandy soil. The Soil Erodibility Factor, "K" value class is .10. The Soil Surface Factor (SSF) is 33.

This soil is used for rangeland and wildlife habitat.

A representative profile of Ma fine sand, 4 to 12 percent slopes, about 1,000 feet east of the southwest corner of section 24, T. 41 S., R. 5 W. in a rangeland area follows:

A11--0 to 5 inches; pale brown (10YR 6/3) fine sand, brown or dark brown (10YR 4/3) when moist; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; mildly alkaline (pH 7.4); clear smooth boundary.

A12--5 to 16 inches; light yellowish brown (10YR 6/4) fine sand, yellowish brown (10YR 5/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.2); gradual, smooth boundary.

C1--16 to 31 inches; very pale brown (10YR 7/3) fine sand, yellowish brown (10YR 5/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.2); gradual, smooth boundary.

C2--31 to 65 inches; light yellowish brown (10YR 6/4) fine sand, yellowish brown (10YR 5/4) when moist; single grain, loose, nonsticky, nonplastic; few very fine and fine roots; moderately alkaline (pH 7.9).

The A1 horizon has hue of 10YR, value of 5 through 7 dry, 3 through 5 moist; and chroma of 3 or 4. It is dominantly fine sand, but ranges to loamy fine sand in places. The A1 horizon is 3 to 16 inches thick. The C horizon has hue of 10YR, value of 6 and 7 dry, 4 through 6 dry and chroma of 3 and 4. In places the C horizon contains up to about 15 percent cobble and gravel.

Soil suitability for range seeding is very poor because of the fine sand surface soil, the low water holding capacity and the 12 to 14 inches precipitation. Plant species generally recommended for seeding are Indian ricegrass, crested wheatgrass and Siberian wheatgrass. Other plant species that grow well in areas with 12 to 14 inches precipitation can be used. Equipment limitations are moderate, because of the sandy soil.



MaD Landscape view of Ma fine sand, 4 to 12 percent slopes. Vegetation is dominantly big sagebrush and scattered Utah juniper. In the background is Rock outcrop cliffs of the Navajo geologic formation.



MaD Profile of Ma fine sand, 4 to 12 percent slopes. A1 horizon is about 16 inches thick. C horizon below. This soil formed in material weathered from the White Cliff member of the Navajo sandstone. Classification is mixed, mesic Ustic Torripsamments.



# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Ma fine sand (MaD)  
 STATE UTAH REPORT NO.  AUTHOR(S) VLM DATE 4/77 REVISED  UNIT MODIFIER   
 CLASSIFICATION AND BRIEF DESCRIPTION

THE Ma SERIES CONSISTS OF VERY DEEP EXCESSIVELY DRAINED SOILS FORMED IN ALLUVIUM ON FANS AND TOESLOPES FROM SANDSTONE UNDER INDIAN RICEGRASS, DROPSEED, BIG SAGEBRUSH AND OAK. MAAT IS 48 TO 52F. MAP IS 12 TO 14 INCHES. FFR IS 140 TO 160 DAYS. A TYPICAL PROFILE HAS A PALE BROWN FINE SAND ABOUT 16 INCHES THICK. UNDERLYING LAYERS ARE VERY PALE BROWN OR LIGHT YELLOWISH BROWN FINE SAND TO 60 INCHES OR MORE. SLOPES ARE 4 TO 12 PERCENT.

FOOTNOTES

ESTIMATED SOIL PROPERTIES													
DEPTH (IN)	USDA TEXTURE		UNIFIED		AASHTO		FRACT. - 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX
								4	10	40	200		
A 0-60	FS		SP-SM, SM		A-3, A-2		0	100	100	65-90	5-25	-	NP
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
	1-5	1.7-1.8	>20	0.06-0.08	6.6-8.4	<2	LOW	.10	5	1	<.5	HIGH	MODERATE
SAME DEPTH AS ABOVE													
FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6.0			-		>60				A	LOW

SANITARY FACILITIES				KEYS ONLY		CONSTRUCTION MATERIAL			
FOOTNOTES						FOOTNOTES			
SEPTIC TANK ABSORPTION FIELDS	8	4-8%: SLIGHT		FIL	191	ROADFILL	GOOD		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
SEWAGE LAGOONS		2-7%: SEVERE: SEEPAGE		SAND	201	SAND	FAIR: EXCESS FINE		
		7+%: SEVERE: SEEPAGE, SLOPE			2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)		SEVERE: SEEPAGE, TOO SANDY		GRAVEL	211	GRAVEL	UNSUITED		
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)		SEVERE: SEEPAGE		SOIL	221	TOPSOIL	POOR: TOO SANDY		
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL		POOR: TOO SANDY				FOOTNOTES	WATER MANAGEMENT		
				PONERS	231		SEEPAGE, SLOPE		
					2		POND RESERVOIR AREA		
					3				
					4				
SHALLOW EXCAVATIONS		SEVERE: CUTBANKS CAVE		DIKES	241		EMBANKMENTS DIKES AND LEVEES	SEEPAGE, PIPING	
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS		4-8%: SLIGHT		PONCAQ	251	EXCAVATED PONDS AQUIFER FED	NO WATER		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS		4-8%: SLIGHT		DRAIN	261	DRAINAGE	NOT NEEDED		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS		4-8%: MODERATE: SLOPE		IRRG	271	IRRIGATION	DROUGHTY, SOIL BLOWING, FAST INTAKE		
		8+%: SEVERE: SLOPE			2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS		4-8%: SLIGHT		TERPAC	281	TERRACES AND DIVERSIONS	TOO SANDY, SOIL BLOWING, SLOPE		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRADED WATERWAYS	SLOPE, DROUGHTY		
					2				
					3				
					4				
					5				

REGIONAL INTERPRETATIONS			
FOOTNOTES			



MbB     Mb fine sand, 2 to 4 percent slopes

This soil is deep and excessively drained. It occurs on nearly level terraces, generally near the terrace escarpment at elevations of 6,400 to 7,100 feet. The soil formed in eolian sand derived mainly from Navajo sandstone. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 43° to 46° F., and the frost-free season is 110 to 130 days. Natural vegetation is peavine, stoneseed, gambel oak, serviceberry, manzanita, pinyon pine and Utah juniper.

This soil occurs near the south rim of Glendale Bench

Included with this soil in mapping are small areas of Ka fine sandy loam, 15 to 40 percent slopes; small areas of Sa very fine sandy loam, 2 to 4 percent slopes; and small areas of La very fine sandy loam, 2 to 4 percent slopes.

In a typical profile the surface layer is brown, fine sand about 14 inches thick. The underlying layer is brown and strong brown, fine sand to a depth of 60 inches or more.

Permeability is rapid. Available water capacity is 3 to 5 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 25 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .10. The Soil Surface Factor (SSF) is 32.

This soil is used for rangeland and wildlife habitat.

A representative profile of Mb fine sand, 2 to 4 percent slopes, about 1,400 feet south and 1,100 feet east of the northwest corner of section 36, T. 41.S., R. 7 W. in a rangeland area follows:

A11--0 to 5 inches; brown (7.5YR 5/4) fine sand, brown or dark brown (7.5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; common very fine and fine, few medium roots; few fine pores; neutral (pH 6.8); clear smooth boundary.

A12--5 to 14 inches; brown (7.5YR 5/4) fine sand, brown or dark brown (7.5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; common very fine and fine, few medium roots; few fine pores; neutral (pH 6.8); clear smooth boundary.

C1--14 to 25 inches; brown (7.5YR 5/4) fine sand, dark yellowish brown (10YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; common very fine and fine, few medium roots; few fine pores; neutral (pH 7.2); gradual smooth boundary.

C2--25 to 34 inches; strong brown (7.5YR 5/4) fine sand, brown or dark brown (7.5YR 4/4) when moist; weak, medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; mildly alkaline (pH 7.6); gradual smooth boundary.

C3--34 to 51 inches; strong brown (7.5YR 5/6) fine sand, reddish brown (5YR 4/4) when moist; weak, medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine roots; neutral (pH 6.8); gradual smooth boundary.

C4--51 to 60 inches; strong brown (7.5YR 5/6) loamy fine sand, reddish brown (5YR 4/4) when moist; weak, medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; moderately calcareous, lime is segregated in soft masses; moderately alkaline (pH 8.0).

The A1 horizon has hue of 7.5YR or 10YR, value of 5 or 6 dry, 4 moist and chroma of 3 or 4. It is mainly fine sand but ranges to loamy fine sand. It is 14 to 16 inches thick. The C horizon has hue of 7.5YR or 5YR, value of 5 or 6 dry, 4 or 5 moist and chroma of 4 through 6. It is dominantly noncalcareous but ranges from slightly calcareous to moderately calcareous below about 50 inches.

Soil suitability for range seeding is very poor due to the low water holding capacity of the soil and the fine sand surface soil. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass, and western wheatgrass. Other plant species that grow well in areas with 14 to 16 inches precipitation can be used. Equipment limitations are moderate because of the sandy texture of the soil.



MbB Landscape view of the Mb fine sand, 2 to 4 percent slopes. The vegetation is dominantly manzanita, stoneseed, Gambel oak, serviceberry, pinyon pine and Utah juniper.

# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Mb fine sand (Mbb)  
 STATE UTAH FIGURE NO.  AUTHOR(S) VLM DATE 8/77 REVISED  UNIT MODIFIER   
 CLASSIFICATION AND DESCRIPTION

THE Mb SERIES CONSISTS OF DEEP EXCESSIVELY DRAINED SOILS FORMED IN WINDBLOWN SANDS ON NEARLY LEVEL TERRACES UNDER INDIAN RICEGRASS, SPIKE DROPSEED, BIG SAGEBRUSH AND GAMBEL OAK. MAT IS 43 TO 46 F. AAP IS 14 TO 16 INCHES. EFP IS 110 TO 130 DAYS. A TYPICAL PROFILE HAS BROWN FINE SAND SURFACE LAYER ABOUT 14 INCHES THICK. THE UNDERLYING LAYERS ARE BROWN AND STRONG BROWN FINE SAND TO A DEPTH OF 60 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE		UNIFIED		AASHTO		FRACT. 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX	
								4	10	40	200			
0-60	FS		SP-SM, SM		A-3, A-2		0	100	100	70-95	5-15	-	NP	
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAVE DEPTH AS ABOVE	2-5	1.7-1.8	6.0-20	0.06-0.08	6.6-8.4	< 2	LOW	.10	5	1	<.5	HIGH	LOW	
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			>6.0			-		60		-			A	LOW

FOOTNOTES		SANITARY FACILITIES			KEYING ONLY	FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	A	SLIGHT:			FILL	191	ROADFILL	B	GOOD
						2			
						3			
						4			
						5			
SEWAGE LAGOONS		SEVERE: SEEPAGE			SAND	201	SAND		POOR: EXCESS FINES
						2			
						3			
						4			
						5			
SANITARY LANDFILL (TRENCH)		SEVERE: SEEPAGE, TOO SANDY			GRAVEL	211	GRAVEL		UNSUITED
						2			
						3			
						4			
						5			
SANITARY LANDFILL (AREA)		SEVERE: SEEPAGE			SOIL	221	TOPSOIL		POOR: TOO SANDY
						2			
						3			
						4			
						5			
DAILY COVER FOR LANDFILL		POOR: TOO SANDY, SEEPAGE					FOOTNOTES	WATER MANAGEMENT	
					PONDERS	231		POND RESERVOIR AREA	SEEPAGE, SLOPE
						2			
						3			
						4			
						5			
SHALLOW EXCAVATIONS		SEVERE: CUTBANKS CAVE			DIKES	241	EMBANKMENTS DIKES AND LEVEES	SEEPAGE, PIPING	
						2			
						3			
						4			
						5			
DWELLINGS WITHOUT BASEMENTS		SLIGHT			PONDING	251	EXCAVATED PONDS AQUIFER FED	NO WATER	
						2			
						3			
						4			
						5			
DWELLINGS WITH BASEMENTS		SLIGHT			DRAIN	261	DRAINAGE	NOT NEEDED	
						2			
						3			
						4			
						5			
SMALL COMMERCIAL BUILDINGS		SLIGHT			IRRIG	271	IRRIGATION	FAST INTAKE, SOIL BLOWING, DROUGHTY	
						2			
						3			
						4			
						5			
LOCAL ROADS AND STREETS		SLIGHT			TERRAC	281	TERRACES AND DIVERSIONS	TOO SANDY, SOIL BLOWING, SLOPE	
						2			
						3			
						4			
						5			
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS					WATERW		GRASSED WATERWAYS	DROUGHTY, SLOPE	
						2			
						3			
						4			
						5			

FOOTNOTES	REGIONAL INTERPRETATIONS

	FOOTNOTES
A	POLLUTION MAY BE A HAZARD TO WATER SUPPLIES.
B	BORROW AREAS MAY BE DIFFICULT TO REVEGETATE.
1	NOT USUALLY UTILIZED BY SHEEP AND CATTLE.

McD     Mc fine sand, 2 to 10 percent slopes

This soil is very deep and somewhat excessively drained. It occurs in alluvial valleys and on broad alluvial fans at elevations of 4,500 to 5,000 feet. This soil formed in alluvium from Navajo sandstone. Average annual precipitation is 9 to 12 inches. Mean annual air temperature is 52° to 56° F., and the frost-free season is 140 to 160 days. Natural vegetation is black grama, galleta, sand dropseed, globemallow, scurf pea, sand sagebrush, big sagebrush and scattered juniper.

This soil occurs mainly in the Short Creek Cane Beds Area.

Included with this soil in mapping are small areas of Pa loamy fine sand, 2 to 4 percent slopes; and small areas of Rb fine sandy loam, 2 to 4 percent slopes.

In a typical profile the surface layer is reddish brown, fine sand about 4 inches thick. The underlying layer is light red and red, fine sand to depths of 60 inches or more.

Permeability is very rapid. Available water capacity is 3 to 5 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 22 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. The Soil Erodibility Factor "K" value class is .10. The Soil Surface Factor (SSF) is 29.

This soil is used for rangeland and wildlife habitat.

A representative profile of Mc fine sand, 2 to 10 percent slopes, in the SW 1/4 of the NW 1/4 of section 9, T. 44 S., R. 9 W. in a rangeland area follows:

A1--0 to 4 inches; reddish brown (5YR 5/4) fine sand, dark reddish brown (5YR 3/3) when moist; single grain; loose, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; mildly alkaline (pH 7.4); clear smooth boundary.

C1--4 to 22 inches; light red (5YR 6/6) fine sand, red (5YR 4/6) when moist; single grain; loose, nonsticky, nonplastic; many very fine, few fine and medium roots; neutral (pH 7.2); abrupt, smooth boundary.

C2--22 to 36 inches; light red (5YR 6/6) fine sand, red (5YR 4/6) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.3); abrupt smooth boundary.

C3--36 to 44 inches; red (5YR 5/6) fine sand, reddish brown (5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.2); gradual, smooth boundary.

C4--44 to 55 inches; red (5YR 5/6) fine sand; reddish brown (5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.2); gradual, smooth boundary.

C5--55 to 78 inches; red (5YR 5/6) fine sand, dark red (5YR 3/6) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.3).

In the A1 horizon value is 4 through 6 when the soils are dry and 3 or 4 when they are moist; and chroma is 3 through 6. The surface layer ranges from fine sand to loamy fine sand in some places. The C horizon ranges from fine sand to loamy sand.

Soil suitability for range seeding is very poor, because of the sandy soil and low water holding capacity and the 9 to 12 inches of precipitation. Equipment limitations are moderate because of the sandy soil.



McD Landscape view of Mc fine sand, 2 to 10 percent slopes. The vegetation is dominantly sand sagebrush, big sagebrush, sand dropseed, black grama, globemallow and scattered Utah juniper. In the background is exposure of Navajo sandstone.

# SOIL INTERPRETATIONS RECORD

MURA(S)	35	KIND OF UNIT	SERIES	UNIT NAME	Mc fine sand (McD)									
STATE	UTAH	RECORD NO.	AUTHOR(S)	VLM	DATE	3/77	REVISED	UNIT MODIFIER						
CLASSIFICATION AND BRIEF SOIL DESCRIPTION														
THE MC SERIES CONSISTS OF VERY DEEP SOMEWHAT EXCESSIVELY DRAINED SOILS FORMED IN ALLUVIUM FROM SANDSTONE IN ALLUVIAL VALLEYS AND BROAD FANS UNDER BLACK GRAMA, GALLETIA, GLOBEMALLOW, AND SANDS SAGEBRUSH. MAAT IS 52 TO 56 F. AAP IS 9 TO 12 INCHES. FFP IS 140 TO 160 DAYS. A TYPICAL PROFILE HAS A REDDISH BROWN FINE SAND SURFACE LAYER ABOUT 4 INCHES THICK. UNDERLYING LAYERS ARE LIGHT RED AND RED FINE SAND TO 60 INCHES OR MORE. SLOPES ARE 2 TO 10 PERCENT														
ESTIMATED SOIL PROPERTIES														
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX				
A 0-60	FS	SP-SM, SM	A-3, A-2	0	100	100	70-95	5-15	-	NP				
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS K T	WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY STEEL CONCRETE			
1-5	1-5	1.6-1.7	>20	0.06-0.03	6.6-7.8	<2	LOW	.10 5	1	<.5	HIGH LOW			
SAME DEPTH AS ABOVE														
FLOODING			HIGH WATER TABLE		CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD	POTENTIAL		
FREQUENCY			DEPTH (FT)		DEPTH (IN)		DEPTH (IN)		INITIAL (IN)		GRP	FROST ACTION		
NONE			> 6		-		> 60		-		A	LOW		
FOOTNOTES			SANITARY FACILITIES			KEYS ONLY			FOOTNOTES			CONSTRUCTION MATERIAL		
SEPTIC TANK ABSORPTION FIELDS			B 2-8%: SLIGHT 8+%: MODERATE: SLOPE			FIL 191			ROADFILL			GOOD		
SEWAGE LAGOONS			2-7%: SEVERE: SEEPAGE 7+%: SEVERE: SEEPAGE, SLOPE			SAND 201			SAND			POOR EXCESS FINES		
SANITARY LANDFILL (TRENCH)			SEVERE: SEEPAGE, TOO SANDY			GRAVEL 211			GRAVEL			UNSUITED		
SANITARY LANDFILL (AREA)			SEVERE: SEEPAGE,			SOIL 221			TOPSOIL			POOR: TOO SANDY, AREA RECLAIM		
DAILY COVER FOR LANDFILL			POOR: TOO SANDY, SEEPAGE, AREA RECLAIM			PONDERS 231			PCND RESERVOIR AREA			SEEPAGE, SLOPE		
FOOTNOTES			BUILDING SITE DEVELOPMENT			Dikes 211			EMBANKMENTS DIKES AND LEVEES			SEEPAGE, PIPING		
SHALLOW EXCAVATIONS			SEVERE: CUTBANKS CAVE			PONDERS 251			EXCAVATED PONDS AQUIFER FED			NO WATER		
DWELLINGS WITHOUT BASEMENTS			2-8%: SLIGHT 8+%: MODERATE: SLOPE			DRAIN 261			DRAINAGE			NOT NEEDED		
DWELLINGS WITH BASEMENTS			2-8%: SLIGHT 8+%: MODERATE: SLOPE			IRRIG 271			IRRIGATION			DROUGHTY, FAST INTAKE, SLOW INTAKE		
SMALL COMMERCIAL BUILDINGS			2-4%: SLIGHT 4-8%: MODERATE: SLOPE 8+%: SEVERE: SLOPE			TERRACE 281			TERRACES AND OVERSIGNS			SLOPE, TOO SANDY, SOIL BLOWING		
LOCAL ROADS AND STREETS			2-8%: SLIGHT 8+%: MODERATE: SLOPE			WATERW			GRADED WATERWAYS			SLOPE DROUGHTY		
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS														
FOOTNOTES			REGIONAL INTERPRETATIONS											

UNIT NAME: Mc RECREATIONAL DEVELOPMENT  
UNIT MODIFIER:

UNIT MODIFIER:		KEYING ONLY		FOOTNOTE	
CAMP AREAS	SEVERE: TOO SANDY	PLAYGS	321	PLAYGROUNDS	2-6%: SEVERE: TOO SANDY
			2		6+%: SEVERE: SLOPE, TOO SANDY
			3		
			4		
			5		
PICNIC AREAS	SEVERE: TOO SANDY	PATHS	331	PATHS AND TRAILS	SEVERE: TOO SANDY
			2		
			3		
			4		
			5		

[illegible][illegible][illegible][illegible]

FOOTNOTES		POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE				
		ALL				
BLACK GRAMA	BOER4	9				
BLUE GRAMA	BOGR2	7				
GALLETA	HIJA	7				
INDIAN RICEGRASS	ORHY	7				
NEEDLEANDTHREAD	STC04	9				
SPIKE DROPSEED	SPC04	9				
OTHER PERENNIAL GRASSES	PPGG	17				
GLOBEMALLOW	SPHAE	1				
OTHER PERENNIAL FORBS	PPFF	4				
SAND SAGEBRUSH	ARTF12	18				
DESERT BITTERBRUSH	PUGL2	7				
OTHER SHRUBS	SSSS	5				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.)						
FAVORABLE YEARS		1100				
NORMAL YEARS						
UNFAVORABLE YEARS		700				

FOOTNOTES	
A	ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH.
B	POLLUTION MAY BE A HAZARD TO WATER SUPPLIES.
1	BORROW AREAS MAY BE DIFFICULT TO REVEGETATE.

MeD     Me sand, 2 to 10 percent slopes

This soil is deep, very deep and excessively drained. It occurs on rolling upland terraces at elevations of 5,000 to 6,400 feet. This soil formed in eolian sand derived mainly from Navajo sandstone. Average annual precipitation is estimated to be 12 to 14 inches. Mean annual air temperature is 50° to 56° F., and the frost-free season is 140 to 160 days. Natural vegetation is dominantly sand dropseed, Indian ricegrass, globemallow, sand sagebrush, big sagebrush, Utah juniper and rabbitbrush.

The soil occurs mainly on John R. Flat, near Red Knolls and near the Coral Pink sand dunes.

Included with this soil in mapping are small areas of Me sand, 10 to 30 percent slopes; small areas of Ma fine sand, 4 to 14 percent slopes; small areas of fine sand soils that are less than 40 inches to bedrock.

In a typical profile the surface layer is brown, sand about 9 inches thick. The underlying layer is brown and reddish brown, sand to depths of 60 inches or more.

Permeability is very rapid. Available water capacity is 3 to 5 inches to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 21 inches. Surface runoff is medium and the erosion hazard is moderate under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. Wind erosion is a problem on this sandy soil. The Soil Erodibility Factor "K" value class is .10. The Soil Surface Factor (SSF) is 45.

This soil is used for rangeland and wildlife habitat.

A representative profile of Me sand, 2 to 10 percent slopes, about 2,650 feet south and 500 feet east of the northwest corner of section 10, T. 42 S., R. 7 W. in a rangeland area follows:

A11--0 to 2 inches; brown (7.5YR 5/4) sand, dark reddish brown (5YR 3/4) when moist; single grain; loose, nonsticky, nonplastic; few very fine, fine and medium roots; medium acid (pH 5.7); abrupt smooth boundary.

A12--2 to 9 inches; brown (7.5YR 5/4) sand, dark reddish brown (5YR 3/4) when moist; single grain; loose, nonsticky, nonplastic; many very fine, few fine and medium roots; few fine pores; slightly acid (pH 6.3); clear smooth boundary.

C1--9 to 21 inches; brown (7.5YR 5/4) sand, dark reddish brown (5YR 3/4) when moist; weak, medium subangular blocky structure; loose, nonsticky, nonplastic; common very fine and fine, few medium and coarse roots; few fine pores; neutral (pH 7.2); gradual smooth boundary.

C2--21 to 30 inches; reddish brown (5YR 5/4) sand, reddish brown (5YR 4/4) when moist; single grain; loose, nonsticky, nonplastic; few fine and very fine roots; neutral (pH 7.2); gradual, smooth boundary.

C3--30 to 48 inches; light reddish brown (5YR 6/4) sand, yellowish red (5YR 4/6) when moist; single grain, loose, nonsticky, nonplastic; very few very fine and fine roots; mildly alkaline (pH 7.6); gradual smooth boundary.

C4--48 to 70 inches; reddish yellow (5YR 6/6) sand, yellowish red (5YR 4/8) when moist; single grain; loose, nonsticky, nonplastic; non-calcareous, mildly alkaline (pH 7.6).

The A1 horizon has hue of 7.5YR or 5YR; value of 4 through 6 dry, and 3 through 5 moist, and chroma of 2 through 6. It is fine sand or sand and is 2 to 11 inches thick. The C horizon has hue of 7.5YR or 5YR; value of 4 through 7 dry, 3 through 5 moist, and chroma of 4 through 8. It is fine sand, sand or loamy fine sand.

Soil suitability for range seeding is very poor because of the sandy soil and low water holding capacity. Plant species generally recommended for seeding are Indian ricegrass, crested wheatgrass and Siberian wheatgrass. Other plant species that grow well in areas with 12 to 14 inches precipitation can be used. Equipment limitations are moderate because of the sandy soil.



MeD Landscape view of Me sand, 2 to 10 percent slopes. The vegetation is dominantly big sagebrush, sand dropseed, Indian ricegrass, sand sagebrush and scattered Utah juniper.



MeD Profile of Me fine sand, 2 to 10 percent slopes. Note the red color that is typical of some soils formed in materials from Navajo sandstone. This soil is classified as mixed, mesic Ustic Torripsamments.



# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Me sand (MeD)  
 STATE UTAH RECORD NO.        AUTHOR(S) VLM DATE 3/77 REVISED    UNIT MODIFIER         
 CLASSIFICATION AND NAME OF DESCRIPTION       

THE Me SERIES CONSISTS OF VERY DEEP EXCESSIVELY ORAINED SOILS FORMED IN WINDBLOWN SANDS FROM SANDSTONE ON ROLLING UPLANDS UNDER PINYON PINE. UTAH JUNIPER, INDIAN RICEGRASS AND SANDHILL MUHLY. MAAT IS 50 TO 56 F. AAP IS 12 TO 14 INCHES. FFP IS 140 TO 160 DAYS. A TYPICAL PROFILE IS BROWN SAND, ABOUT 9 INCHES THICK. THE UNDERLYING LAYERS ARE BROWN, AND REDDISH BROWN, SAND TO 60 INCHES OR MORE. SLOPES ARE 2 TO 10 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. - 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
A 0-60	S	SP-SM, SM, SP	A-3, A-2	0	100	100	70-95	0-15	-	NP				
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY G/CM <sup>3</sup>	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	0-5	1.6-1.7	>20	0.05-0.08	6.1-7.3	<2	LOW	.10	5	1	.5-1	HIGH	MODERATE	
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			>6.0			-		>60		-		A	Low	

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	B	2-8%: SLIGHT:		FILL	191	ROADFILL	1	G000	
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
SEWAGE LAGOONS		2-7%: SEVERE: SEEPAGE		SAND	201	SAND	1	POOR: EXCESS FINES	
		7+%: SEVERE: SLOPE, SEEPAGE			2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)		SEVERE: SEEPAGE, TOO SANDY		GRAVEL	211	GRAVEL		UNSUITEO	
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)		SEVERE: SEEPAGE		SOIL	221	TOPSOIL	1	POOR: TOO SANDY	
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL		POOR: TOO SANDY				FOOTNOTES	WATER MANAGEMENT		
				PONDERS	231		POND RESERVOIR AREA	SLOPE, SEEPAGE	
					2				
					3				
					4				
FOOTNOTES		BUILDING SITE DEVELOPMENT				EMBANKMENTS DIKES AND LEVEES		PIPING, SEEPAGE	
SHALLOW EXCAVATIONS		SEVERE: CUTBANKS CAVE		DIKES	241				
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS		2-8%: SLIGHT		PONDAGE	251	EXCAVATED PONDS AQUIFER FED	NO WATER		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS		2-8%: SLIGHT		DRAIN	261	DRAINAGE	NOT NEEDED		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS		2-4%: SLIGHT		IRRIG	271	IRRIGATION	DROUGHTY, SOIL BLOWING, FAST INTAKE		
		4-8%: MODERATE: SLOPE			2				
		8+%: SEVERE: SLOPE			3				
					4				
					5				
LOCAL ROADS AND STREETS		2-8%: SLIGHT		TERPAC	281	TERPACES AND DIVERGINGS	SLOPE, TOO SANDY		
		8+%: MODERATE: SLOPE			2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRASSED WATERWAYS	SLOPE, DROUGHTY		
					2				
					3				
					4				
					5				

FOOTNOTES	REGIONAL INTERPRETATIONS

UNIT NAME. Mc RECREATIONAL DEVELOPMENT  
UNIT MODIFIER.

UNIT MODIFIER		KEYING ONLY		FOOTNOTE	
CAMP AREAS	SEVERE: TOO SANDY	PLAY	321	PLAYGROUNDS	2-6%: SEVERE: TOO SANDY
			2		6+2%: SEVERE: SLOPE, TOO SANDY
			3		
			4		
			5		
PICNIC AREAS	SEVERE: TOO SANDY	PATHS	331	PATHS AND TRAILS	SEVERE: TOO SANDY
			2		
			3		
			4		
			5		

[illegible][illegible][illegible][illegible]

ECOTONE		POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS - DETERMINING PHASE				
		ALL				
INDIAN RICEGRASS	ORHY	5				
SANDHILL MUHLY	MUPU2	5				
OTHER PERENNIAL GRASSES	PPGG	10				
OTHER PERENNIAL FORBS	PPFF	10				
ANTELOPE BITTERBRUSH	PUR2	3				
BIG SAGEBRUSH	ARTR2	7				
GAMBEL OAK	QUBA	7				
PIYON PINE 2/	PIED	15				
UTAH JUNIPER 2/	JUOS	20				
OTHER SHRUBS	SSSS	18				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.)						
FAVORABLE YEARS		1200				
NORMAL YEARS						
UNFAVORABLE YEARS		700				

SYM.	FOOTNOTES
A	ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH
B	POLLUTION MAY BE A HAZARD TO WATER SUPPLIES.
1	BORROW AREAS MAY BE DIFFICULT TO REVEGETATE.
2	NOT USUALLY UTILIZED BY SHEEP AND CATTLE

MeF    Me sand-Rock outcrop complex, steep

This mapping unit is a complex consisting of about 80 percent Me sand, 10 to 30 percent slopes, and about 10 percent Rock outcrop and 10 percent other soils.

Included within this complex in mapping are small areas of a shallow, fine sand soil on some of the steeper slopes in the complex.

This complex occurs on rolling upland terraces at elevations of 5,000 to 6,400 feet. The Me soil and Rock outcrop occurs in an intermixed pattern, with the Me soil occurring mainly in valley positions and the Rock outcrop on steep slopes and escarpments. Average annual precipitation is 12 to 14 inches. Mean annual air temperature is 50° to 56° F. and the frost free period is 140 to 160 days. Natural vegetation is dominantly sand dropseed, globe mallow, sand sagebrush, big sagebrush, Utah juniper and rabbitbrush.

This complex occurs mainly on John R. Flat, near Red Knolls, and near the Coral Pink sand dunes.

The Me soil has a profile similar to that described for the Me sand, 2 to 10 percent slopes, but it has slopes of 10 to 30 percent (See mapping unit MeD for a detailed profile description).

In a typical profile the surface layer is brown sand about 9 inches thick. The underlying layer is brown and reddish brown sand to a depth of 60 inches or more.

Permeability is very rapid. Available water capacity is 3 to 5 inches, to a depth of 5 feet or more. Organic matter content in the surface layer is very low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 20 inches. Surface runoff is medium and the erosion hazard is moderate under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. Wind erosion is a problem on this sandy soil.. The Soil Erodibility Factor "K" value class is .10. The Soil Surface Factor (SSF) is 45.

The Rock outcrop consists of nearly barren exposures of sandstone.

Soil suitability for range seeding is very poor because of the sandy soil and low water holding capacity. Plant species generally recommended for seeding are Indian ricegrass, crested wheatgrass, and Siberian wheatgrass. Other plant species that grow well in areas with 12 to 14 inches precipitation can be used. Equipment limitations are moderate because of the sandy soil.





UNIT NAME Me  
UNIT MODIFIER

## RECREATIONAL DEVELOPMENT

CLASS-DETERMINING PHASE	FOOTNOTE	PLAYGROUNDS		FOOTNOTE
		PERCENT	SEVERE	
CAMP AREAS	10-15% SEVERE: TOO SANDY 15+% SEVERE: SLOPE, TOO SANDY	10-15% 15+%	SEVERE: SLOPE, TOO SANDY	SEVERE: SLOPE, TOO SANDY
PICNIC AREAS	10-15% SEVERE: TOO SANDY 15+% SEVERE: SLOPE, TOO SANDY	10-15% 15+%	SEVERE: SLOPE, TOO SANDY	10-25% SEVERE: TOO SANDY 25+% SEVERE: SLOPE, TOO SANDY

## CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

CLASS-DETERMINING PHASE	CAPABILITY	CROPS AND PASTURE															
		IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.	IRR.
ALL	75																

## WOODLAND SUITABILITY

CLASS-DETERMINING PHASE	CROPS	MANAGEMENT PROBLEMS					POTENTIAL PRODUCTIVITY		TREES TO PLANT
		EROSION HAZARD	EQUIP. LIMIT	SEEDLING MORT.	WINDTH. HAZARD	PLANT COMPET.	COMMON TREES	SITE INDEX	
ALL	55	MODERATE	MODERATE	MODERATE	SLIGHT	MODERATE	PINYON UTAH JUNIPER	28	

## WINDBREAKS

CLASS-DETERMINING PHASE	SPECIES	HT	SPECIES	HT	SPECIES	HT	SPECIES	HT
	NONE							

## WILDLIFE HABITAT SUITABILITY

CLASS-DETERMINING PHASE	POTENTIAL FOR HABITAT ELEMENTS							POTENTIAL FOR HABITAT FOR:				
	GRAIN & SEED	GRASS & LEGUME	WILD HERB.	HARDWOOD TREES	CONIFER PLANTS	SHRUBS	WETLAND PLANTS	SHALLOW WATER	OPENLAND WILDLIFE	WOODLAND WILDLIFE	WETLAND WILDLIFE	RANGELAND WILDLIFE
ALL	V. POOR	V. POOR	POOR	-	V. POOR	POOR	V. POOR	V. POOR	V. POOR	POOR	V. POOR	POOR

## POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)

COMMON PLANT NAME	PLANT SYMBOL (NLSN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE										
		ALL										
INDIAN RICEGRASS	ORH1	5										
SANDHILL MCHLY	MUPU2	5										
OTHER PERENNIAL GRASSES	PPGG	10										
OTHER PERENNIAL FORBS	PPFF	10										
ANTELOPE BITTERBRUSH	PUTR2	3										
BIG SAGEBRUSH	ARTR2	7										
GAMBEL OAK	QUGA	7										
PINYON 2/	PIED	15										
UTAH JUNIPER 2/	JUOS	20										
OTHER SHRUBS	SSSS	18										
TOTAL ANNUAL PRODUCTION (LBS./A.) DRY WT												
FAVORABLE YEARS		1200										
NORMAL YEARS												
UNFAVORABLE YEARS		700										

## FOOTNOTES

- A. ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PIEDON FOR DANE COUNTY, UTAH.
- B. POLLUTION MAY BE A HAZARD TO WATER SUPPLIES.
1. BORROW AREAS MAY BE DIFFICULT TO REVEGETATE.
2. NOT USUALLY UTILIZED BY SHEEP AND CATTLE.

MtF Mt very stony loamy fine sand, 20 to 50 percent slopes

This soil is moderately deep and somewhat excessively drained. It occurs on severely eroded, dissected mountain slopes and mesa remnants at elevations of 4,500 to 5,500 feet. This soil formed in residuum derived mainly from sandstone and shale. Average annual precipitation is estimated to be 10 to 14 inches. Mean annual air temperature is 53 to 55° F., and the frost-free season is 165 to 170 days. Natural vegetation is Indian ricegrass, yucca, serviceberry, Utah juniper and pinyon pine.

The soil occurs mainly near Cane Beds and near Short Creek.

Included with this soil in mapping are small areas of Rb fine sandy loam, 2 to 4 percent slopes; and a soil similar to the Mt soil except it has very cobbly heavy sandy loam to very cobbly clay loam subsoil.

In a typical profile the surface layer is reddish yellow, very stony loamy fine sand about 4 inches thick. The underlying layer is strong brown, stony loamy fine sand over sandstone bedrock at depths of about 28 inches.

Permeability is moderately rapid. Available water capacity is 1 to 2 inches above the bedrock. Organic matter content in the surface layer is low, about 1 percent. Effective rooting depth is 20 to 40 inches, but most roots are in the upper 10 inches. Surface runoff is rapid and the erosion hazard is high. The Soil Erodibility Factor "K" value class is .10. The Soil Surface Factor (SSF) is 69.

This soil is used mainly for wildlife habitat.

A representative profile of Mt very stony loamy fine sand, 20 to 50 percent slopes, occurs in Mohave County, Arizona in section 16, T. 41 N., R. 6 W. in a wildlife area follows:

A1--0 to 4 inches; reddish yellow (7.5YR 7/6) very stony loamy fine sand, reddish yellow (7.5YR 6/6) when moist; single grain; loose, nonsticky, nonplastic; few, fine and medium roots; 10 percent stone, 30 percent cobble and 20 percent gravel; mildly alkaline (pH 7.8); gradual wavy boundary.

C1--4 to 28 inches; strong brown (7.5YR 5/6) stony loamy fine sand, strong brown (7.5YR 5/6) when moist; single grain; loose, nonsticky, nonplastic; few fine and medium roots; 10 percent stone, 30 percent cobble, 30 percent gravel; mildly alkaline (pH 7.8).

R--28 inches; sandstone bedrock.

The A1 horizon has hue of 7.5YR or 5YR, value of 4 through 7 when the soils are dry, 4 through 6 when they are moist; and chroma of 3 through 6. It is dominantly very stony loamy fine sand but ranges to loamy sand. The C horizon has hue of 7.5YR or 5YR, value of 5 through 8 when

the soils are dry, 4 through 6 when they are moist; and chroma of 3 through 6. It ranges from stony loamy fine sand to very gravelly fine sandy loam or loamy sand.

Soil suitability for range seeding is very poor because of the very stony surface soil the steep slopes, very low water holding capacity of the soils and the 10 to 14 inches precipitation. Equipment limitations are severe because of the steep slopes and stony sandy soils.

# SOIL INTERPRETATIONS RECORD

(MIF)

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Mt very stony loamy fine sand  
 STATE UTAH RECORD NO. AUTHOR(S) VLM DATE 3/77 REVISED UNIT MODIFIER  
 CLASSIFICATION AND DESCRIPTION

THE M<sub>1</sub> SERIES CONSISTS OF MODERATELY DEEP, SOMEWHAT EXCESSIVELY DRAINED SOILS FORMED IN RESIDUUM FROM SANDSTONE AND SHALE ON MOUNTAIN SLOPES UNDER NEEDLEANDTHREAD, LEADBUSH, PINYON, PINE AND JUNIPER. MAAT IS 52 TO 62F. AAP IS 10 TO 14 INCHES. FFP IS 165 TO 170 DAYS. A TYPICAL PROFILE HAS A REDDISH YELLOW, VERY STONY LOAMY FINE SAND SURFACE 4 INCHES THICK, THE UNDERLYING LAYER IS STRONG BROWN STONY LOAMY FINE SAND 24 INCHES THICK OVER SANDSTONE BEDROCK. SLOPES ARE 20 TO 50 PERCENT.

ESTIMATED SOIL PROPERTIES										
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. < 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX
					4	10	40	200		
0-4	STV-LFS	GM, GP-GM, SM, SP-SM	A-1	20-30	45-65	35-60	20-40	5-15	-	NP
4-28	GR-LFS, ST-LFS	GM, GP-GM, SM, SP-SM	A-1	15-25	35-55	30-55	15-40	5-15	-	NP
28	UWB									

DEPTH (IN)	CLAY (PCT OF < 2MM)	MOIST BULK DENSITY (G CM <sup>3</sup> )	PERMEABILITY (IN HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
3-10	3-10	1.6-1.8	2.0-6.0	0.04-0.06	7.4-9.0	< 2	LOW	10	1	8	1-2	HIGH	MODERATE
3-10	3-10	1.6-1.8	2.0-6.0	0.04-0.06	7.4-9.0	< 2	LOW	10					
SAVE DEPTH AS ABOVE													

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL IN	TOTAL IN		
NONE			> 6.0					20-40	HARD	-		C	LOW

SANITARY FACILITIES				KEYING ONLY		CONSTRUCTION MATERIAL			
FOOTNOTES				FILL	191	FOOTNOTES			
SEPTIC TANK ABSORPTION FIELDS	SEVERE: DEPTH TO ROCK: SLOPE				2	ROADFILL	20-25%: POOR - THIN LAYER, AREA RECLAIM		
					3		25%: POOR: THIN LAYER, AREA RECLAIM, SLOPE		
					4				
					5				
SEWAGE LAGOONS	SEVERE: SEEPAGE, DEPTH TO ROCK, SLOPE			SAND	201	SAND	POOR: EXCESS FINES		
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)	20-25%: SEVERE: DEPTH TO ROCK, SEEPAGE			GRAVEL	211	GRAVEL	POOR: EXCESS FINES		
	25%: SEVERE: DEPTH TO ROCK SEEPAGE, SLOPE				2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)	SEVERE: SEEPAGE, SLOPE			SOIL	221	TOPSOIL	POOR: LARGE STONE, SMALL STONE, SLOPE		
					2				
					3				
					4				
					5				

WATER MANAGEMENT			
FOOTNOTES			
DAILY COVER FOR LANDFILL	POOR: LARGE STONES, SLOPE, THIN LAYER	PONDERS	231
			2
			3
			4
			5
		POND RESERVOIR AREA	

BUILDING SITE DEVELOPMENT			
FOOTNOTES			
SHALLOW EXCAVATIONS	SEVERE: DEPTH TO ROCK, CUTBANKS CAVE, SLOPE	DICES	271
			2
			3
			4
			5
DWELLINGS WITHOUT BASEMENTS	SEVERE: SLOPE	POND	251
			2
			3
			4
			5
DWELLINGS WITH BASEMENTS	SEVERE: DEPTH TO ROCK, SLOPE	DRAIN	261
			2
			3
			4
			5
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE	IRFIG	271
			2
			3
			4
			5
LOCAL ROADS AND STREETS	SEVERE: SLOPE	TERPAC	281
			2
			3
			4
			5
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS		WATERW	
			2
			3
			4
			5

REGIONAL INTERPRETATIONS			
FOOTNOTES			

CAMP FOOTPRINT		FOOTPRINT		PLAYING ONLY		FOOTNOTE	
CAMP AREAS	SEVERE: SLOPE, LARGE STONES	PLAYGROUND	21	PLAYGROUNDS	SEVERE: LARGE STONES, SLOPE, SMALL STONES		
			2				
			3				
			4				
			5				
PICKUP AREAS	SEVERE: SLOPE, LARGE STONES	PATHS	21	PATHS AND TRAILS	20-25%: SEVERE: LARGE STONES		
			2		25%: SEVERE: SLOPE, LARGE STONES		
			3				
			4				
			5				

[illegible][illegible][illegible][illegible]

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)		PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE			
COMMON PLANT NAME	PLANT SYMBOL (NLSPL)	ALL			
BLACK GRAMA	BOER4	3			
BLUE GRAMA	BOGR2	2			
GALLET	HIJA	3			
INDIAN RICEGRASS	ORHY	2			
NEEDLEANDTHREAD	STCQ4	8			
NEVADA BLUEGRASS	PONE3	3			
SAND DROPSEED	SPCR	2			
OTHER PERENNIAL GRASSES	PPGG	2			
OTHER PERENNIAL FORBS	PPFE	5			
BROADLEAF YUCCA 1/	YUAR	5			
LEADBUSH	SHRO	8			
NEVADA MORMON TEA	EPNE	3			
PIÑON PINE 1/	PIED	5			
UTAH JUNIPER 1/	JUOS	40			
OTHER SHRUBS	SSSS	9			
POTENTIAL PRODUCTION (LBS./AC. DRY WT.):					
FAVORABLE YEARS		1200			
NORMAL YEARS					
UNFAVORABLE YEARS		800			

[illegible]

PaB     Pa fine sandy loam, 2 to 4 percent slopes

This soil is very deep and well drained. It occurs on old alluvial fans and in alluvial valleys at elevations of 4,800 to 5,200 feet. It formed in alluvium weathered from sandstone, siltstone and shale. Average annual precipitation is 10 to 12 inches. Mean annual air temperature is 53° to 55° F., and the frost-free season is 165 to 170 days. Natural vegetation is dominantly galleta, blue grama, black grama, sand dropseed, globemallow and fourwing saltbrush.

This soil occurs mainly in the Cane Beds - Short Creek area.

Included with this soil in mapping are small areas of Pa loamy fine sand, 2 to 4 percent slopes; and small areas of Rb fine sandy loam, 2 to 4 percent slopes.

In a typical profile the surface layer is brown fine sandy loam, about 5 inches thick. The subsoil is yellowish red fine sandy loam about 9 inches thick. The substratum is yellowish red fine sandy loam to 60 inches or more.

Permeability is moderately rapid. Available water capacity is 6 to 8.5 inches to a depth of 5 feet or more. Organic matter content in the surface layer is low, about 1 percent. Effective rooting depth of 60 inches or more, but most roots are in the upper 14 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .24. The Soil Surface Factor (SSF) is 28.

This soil is used for rangeland and wildlife habitat.

A representative profile of Pa fine sandy loam, 2 to 4 percent slopes in Mohave County, Arizona in section 16, T. 41 N., R. 6 W. in a rangeland area follows:

Al--0 to 5 inches; brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) when moist; weak, medium platy structure; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; neutral (pH 7.1); abrupt smooth boundary.

B2lt--5 to 11 inches; yellowish red (5YR 4/6) heavy fine sandy loam, dark reddish brown (5YR 3/4) when moist; moderate, medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; many very fine, few fine roots; few very fine, fine medium pores; few thin clay films in pores; moderately alkaline (pH 8.1); clear smooth boundary.

C1ca--14 to 21 inches; yellowish red (5YR 4/6) fine sandy loam, dark reddish brown (5YR 3/4) when moist; weak and moderate, coarse subangular blocky structure; slightly hard, friable, slightly sticky; nonplastic; few very fine, fine roots; common very fine, and fine, few medium pores; moderately calcareous, lime is in seams and soft masses; strongly alkaline (pH 8.6); clear smooth boundary.

C2--21 to 30 inches; yellowish red (5YR 4/6) fine sandy loam, dark reddish brown (5YR 3/4) when moist; weak, coarse subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; few very fine, few fine roots; common fine and very fine pores; slightly calcareous; lime is in veins; moderately alkaline (pH 8.4); gradual smooth boundary.

C3--30 to 60 inches; yellowish red (5YR 4/6) fine sandy loam, reddish brown (5YR 4/4) when moist; massive; soft, very friable, nonsticky nonplastic; few very fine, fine roots; few fine pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.5).

The A1 horizon has hue of 5YR or 7.5YR, value of 4 or 5 dry and 3 or 4 moist; and chroma of 3 or 4. It is dominantly fine sandy loam, but in places is marginal to loamy fine sand. It is 4 to 11 inches thick. The B2t horizon has hue of 5YR or 2.5YR, value of 3 through 5 when dry and 3 or 4 when they are moist; and chroma of 4 through 6. It is 8 to 18 inches thick. The C horizon ranges from fine sandy loam to loamy fine sand, and thin strata of sand, and it ranges from slightly to strongly calcareous.

Soil suitability for range seeding is poor, because of the low rainfall. Plant species generally recommended for seeding are Indian ricegrass, crusted wheatgrass and Siberian wheatgrass. Other plant species that grow well in areas with 10 to 12 inches precipitation can be used. Equipment limitations are slight.



PaB Landscape view of Pa fine sandy loam, 2 to 4 percent slopes. The vegetation is dominantly galleta, blue grama, black grama, sand dropseed and fourwing saltbush. The hills in the upper right background are in mapping unit MtF--Mt very stony loamy fine sand, 20 to 50 percent slopes.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35	KIND OF UNIT (SERIES)	UNIT NAME Pa fine sandy loam (PaB)
STATE UTAH	DATE 3/77	REVISOR
CLASSIFICATION AND DESCRIPTION		

THE Pa SERIES CONSISTS OF VERY DEEP, WELL DRAINED SOILS FORMED IN ALLUVIUM FROM SANDSTONE, SILTSTONE AND SHALE ON FANS AND VALLEYS UNDER GALLET, BLUE GRAMA, GLOBEMALLOW AND FOURWING SALT BUSH. MAAT IS 53 TO 55 F. AAP IS 10 TO 12 INCHES. FFP IS 165 TO 170 DAYS. A TYPICAL PROFILE HAS A BROWN FINE SANDY LOAM SURFACE LAYER 5 INCHES THICK. THE SUBSOIL IS YELLOWISH RED FINE SANDY LOAM 9 INCHES THICK AND THE SUBSTRATUM IS YELLOWISH RED FINE SANDY LOAM, TO 60 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.

ESTIMATED SOIL PROPERTIES													
DEPTH (IN)	USDA TEXTURE		UNIFIED		AASHTO		FRACT. + 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX
								4	10	40	200		
A	0-5	FSL	SM, SM-SC		A-4		0	100	100	70-85	35-50	20-30	NP-10
	5-60	FSL	SM-SC, SM, ML, CL-ML		A-4		0	100	100	70-85	40-60	20-30	NP-10
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER PCT	CORROSIVITY	
								K	T			STEEL	CONCRETE
SAME DEPTH AS ABOVE	10-15	1.5-1.6	2.0-6.0	0.10-0.14	6.6-7.3	< 2	LOW	.24	5	3	.5-2	HIGH	HIGH
	12-18	1.5-1.7	2.0-6.0	0.10-0.14	7.9-9.0	< 2	LOW	.24					
FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			> 6			-		> 60		-		B	MODERATE

FOOTNOTES				SANITARY FACILITIES				KEYING ONLY				FOOTNOTES				CONSTRUCTION MATERIAL			
SEPTIC TANK ABSORPTION FIELDS				SLIGHT				FILL				ROADFILL				GOOD:			
SEWAGE LAGOONS				SEVERE: SEEPAGE				SAND				SAND				UNSUITED:			
SANITARY LANDFILL (TRENCH)				MODERATE: SEEPAGE				GRAVEL				GRAVEL				UNSUITED			
SANITARY LANDFILL (AREA)				MODERATE: SEEPAGE				SOIL				TOPSOIL				GOOD			
DAILY COVER FOR LANDFILL				GOOD															
FOOTNOTES				BUILDING SITE DEVELOPMENT								FOOTNOTES				WATER MANAGEMENT			
SHALLOW EXCAVATIONS				SLIGHT:				Dikes				EMBANKMENTS DIKES AND LEVEES				SEEPAGE			
DWELLINGS WITHOUT BASEMENTS				SLIGHT:				POND/DAQ				EXCAVATED PONDS AQUIFER FED				NO WATER			
DWELLINGS WITH BASEMENTS				SLIGHT:				DRAIN				DRAINAGE				NOT NEEDED			
SMALL COMMERCIAL BUILDINGS				SLIGHT:				IRRIG				IRRIGATION				SLOPE			
LOCAL ROADS AND STREETS				SLIGHT:				TER/RAC				TERRACES AND DIVERSIONS				SLOPE			
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS								WATERW				GRADED WATERWAYS				SLOPE			
FOOTNOTES				REGIONAL INTERPRETATIONS															

FOOTNOTES	
A	ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE PEDON FOR KANE COUNTY, UTAH.
1	BORROW AREAS MAY BE DIFFICULT TO REVEGETATE

PbB Pa loamy fine sand, 2 to 4 percent slopes

This soil is very deep and well drained. It occurs on old alluvial fans and in alluvial valleys at elevations of 4,800 to 5,200 feet. It formed in alluvium weathered from sandstone, siltstone and shale. Average annual precipitation is 10 to 12 inches. Mean annual air temperature is 53° to 55° F., and the frost-free season is 165 to 170 days. Natural vegetation is galleta, blue grama, black grama, sand dropseed, globemallow and fourwing saltbush.

The soil occurs in the Cane Bed, Colorado City, area in Arizona.

Included with this soil in mapping are small areas of Pa fine sandy loam, 2 to 4 percent slopes and small areas of Rb fine sandy loam, 2 to 4 percent slopes and areas of Mb fine sand, 2 to 4 percent slopes.

In a typical profile the surface layer is brown loamy fine sand about 5 inches thick. The subsoil is yellowish red fine sandy loam about 9 inches thick. The substratum is yellowish red fine sandy loam to 60 inches or more.

Permeability is moderately rapid. Available water capacity is 6 to 8.0 inches to a depth of 5 feet or more. Organic matter content in the surface layer is low about 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 14 inches. Surface runoff is medium and the erosion hazard is moderate under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. Wind erosion is a problem on the sandy soil. The Soil Erodibility Factor, "K" value class is .20. The Soil Surface Factor (SSF) is 28.

This soil is used for rangeland and wildlife habitat.

This soil has a profile similar to that described for the PaB fine sandy loam, in mapping unit PaB except for surface layer is loamy fine sand. See mapping unit PaB for the detailed profile description.

Soil suitability for range seeding is poor because of the loamy fine sand surface layer. Plant species generally recommended for seeding are Indian ricegrass, crested wheatgrass and Siberian wheatgrass. Other plant species that grow well in areas with 10 to 12 inches precipitation can be used. Equipment limitations are severe because of the loamy fine sand surface layer.



# SOIL INTERPRETATIONS RECORD

MIRA(S) 35 KIND OF UNIT SERIES UNIT NAME Pa loamy fine sand (PbB)  
 STATE UTAH FIELD NO. AUTHOR(S) VLM DATE 3/77 REVISED UNIT MODIFIER  
 CLASSIFICATION AND DESCRIPTION

THE Pa SERIES CONSIST OF VERY DEEP, WELL DRAINED SOILS FORMED IN ALLUVIUM FROM SANDSTONE AND SHALE ON FANS AND VALLEYS UNDER GALLETIA, GRAMA, DROPSEED AND FOURWING SALTBUCH. MAAT IS 52 TO 55 F. AAP IS 10 TO 12 INCHES. FFP IS 165 TO 170 DAYS. A TYPICAL PROFILE HAS A BROWN LOAMY FINE SAND SURFACE 5 INCHES THICK. THE SUBSOIL IS YELLOWISH RED FINE SANDY LOAM 9 INCHES THICK. THE SUBSTRATUM IS FINE SANDY LOAM TO 60 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.

## ESTIMATED SOIL PROPERTIES

FOOTNOTES		ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. - 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX			
					4	10	40	200					
0-5	LFS	SM	A-2	0	100	100	70-85	15-30	-	NP			
5-60	FSL	SM-SC, SM, CL-ML, ML	A-4	0	100	100	70-85	40-60	20-30	NP-10			
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION pH	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
SAME DEPTH AS ABOVE	5-10	1.6-1.7	6.0-20	0.07-0.10	6.6-7.3	< 2	LOW	.20	5	2	.5-2	HIGH	MODERATE
	12-18	1.5-1.7	7.9-9.0	0.10-0.14	7.9-9.0	< 2	LOW	.24					
FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			> 6.0			-		> 60		-		B	MODERATE

SANITARY FACILITIES					CONSTRUCTION MATERIAL				
FOOTNOTES					KEYING ONLY				
SEPTIC TANK ABSORPTION FIELDS	SLIGHT				FILL	191			GOOD
						2			
						3			
						4			
						5			
SEWAGE LAGOONS	SEVERE: SEEPAGE				SAND	201			UNSUITED
						2			
						3			
						4			
						5			
SANITARY LANDFILL (TRENCH)	MODERATE: SEEPAGE				GRAVEL	211			UNSUITED
						2			
						3			
						4			
						5			
SANITARY LANDFILL (AREA)	MODERATE: SEEPAGE				SOIL	221			FAIR: TOO SANDY
						2			
						3			
						4			
						5			
DAILY COVER FOR LANDFILL	GOOD				PONDERS	231			SLOPE, SEEPAGE
						2			
						3			
						4			
						5			
SHALLOW EXCAVATIONS	SLIGHT:				DIKES	241			SEEPAGE, PIPING
						2			
						3			
						4			
						5			
DWELLINGS WITHOUT BASEMENTS	SLIGHT:				PONDAQ	251			NO WATER
						2			
						3			
						4			
						5			
DWELLINGS WITH BASEMENTS	SLIGHT				DRAIN	261			NOT NEEDED
						2			
						3			
						4			
						5			
SMALL COMMERCIAL BUILDINGS	SLIGHT				IRRIG	271			SLOPE, FAST INTAKE, SOIL BLOWING
						2			
						3			
						4			
						5			
LOCAL ROADS AND STREETS	SLIGHT				TERPAC	281			SLOPE, TOO SANDY
						2			
						3			
						4			
						5			
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS					WATERW				SLOPE, DROUGHTY
						2			
						3			
						4			
						5			

## REGIONAL INTERPRETATIONS

FOOTNOTE		PEYING ONLY		FOOTNOTE	
CAMP AREAS	MODERATE: TOO SANDY	PLAYGR	321	PLAYGROUNDS	MODERATE: SLOPE, TOO SANDY
			2		
			3		
			4		
			5		
PICNIC AREAS	MODERATE: TOO SANDY	PATHS	331	PATHS AND TRAILS	MODERATE: TOO SANDY
			2		
			3		
			4		
			5		

[illegible][illegible][illegible][illegible]

FOOTNOTES		POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)				
COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (BY WEIGHT) BY CLASS-DETERMINING PHASE				
		ALL				
BLUE GRAMA	BOGR2	15				
BLACK GRAMA	BOER4	12				
GALLET	HIJA	30				
SAND DROPSEED	SPCR	10				
SPIKED DROPSEED	SPC04	2				
OTHER PERENNIAL GRASSES	PPGG	5				
SCARLET GLOBEMALLOW	SPC0	15				
FOURWING SALTBUSH	ATCA2	6				
OTHER SHRUBS	SSSS	5				
POTENTIAL PRODUCTION (LBS./AC. DRY WT.):						
FAVORABLE YEARS		1200				
NORMAL YEARS						
UNFAVORABLE YEARS		500				

	UNAVAILABLE YEARS	500				
BORROW AREAS MAY BE DIFFICULT TO REVEGETATE.	FOOTNOTES					

RbB     Rb fine sandy loam, 2 to 4 percent slopes

This soil is very deep and well drained. It occurs on alluvial fans at elevations of 4,800 to 5,400 feet. This soil formed in alluvium from sandstone and shale. Average annual precipitation is estimated to be 10 to 12 inches. Mean annual air temperature is 53° to 55° F., and the frost-free season is 160 to 175 days. Natural vegetation is dominantly galleta, blue grama, black grama, sand dropseed, and fourwing saltbush.

This soil occurs mainly in the Cane Beds- Short Creek Area.

Included with this soil in mapping are small areas of Pa fine sandy loam, 2 to 4 percent slopes; and small areas of Mc fine sand, 2 to 10 percent slopes.

In a typical profile the surface layer is reddish brown fine sandy loam about 7 inches thick. The underlying layer is reddish brown very fine sandy loam to 60 inches or more.

Permeability is moderately rapid. Available water capacity is 7 to 9 inches to a depth of 5 feet or more. Organic matter content in the surface layer is low, less than 1 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 25 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is moderate. The Soil Erodibility Factor "K" value class is .28 in the upper 7 inches and .32 below 7 inches. The Soil Surface Factor (SSF) is 22.

This soil is used for rangeland and wildlife habitat.

A representative profile of Rb fine sandy loam, 2 to 4 percent slopes occurs in Mohave County, Arizona, in the SE 1/4 of the SW 1/4 of Section 13, T. 41 N., R. 6 W. in a rangeland area follows:

Al--0 to 7 inches; reddish brown (5YR 5/4) fine sandy loam, dark reddish brown (5YR 3/4) when moist; weak, medium platy structure; soft, very friable, nonsticky, nonplastic; common very fine, few fine and medium roots; few fine and medium pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.5); clear smooth boundary.

Cl--7 to 25 inches; reddish brown (5YR 5/4) very fine sandy loam, dark reddish brown (5YR 3/4) when moist; moderate, coarse subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; few very fine and coarse common fine and medium pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.7); gradual, smooth boundary.

C2--25 to 40 inches; reddish brown (5YR 5/4) very fine sandy loam, dark reddish brown (5YR 3/4) when moist; weak, medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine, fine, and medium roots; few very fine, fine and medium pores; thin strata of loamy fine sand; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.7); gradual smooth boundary.

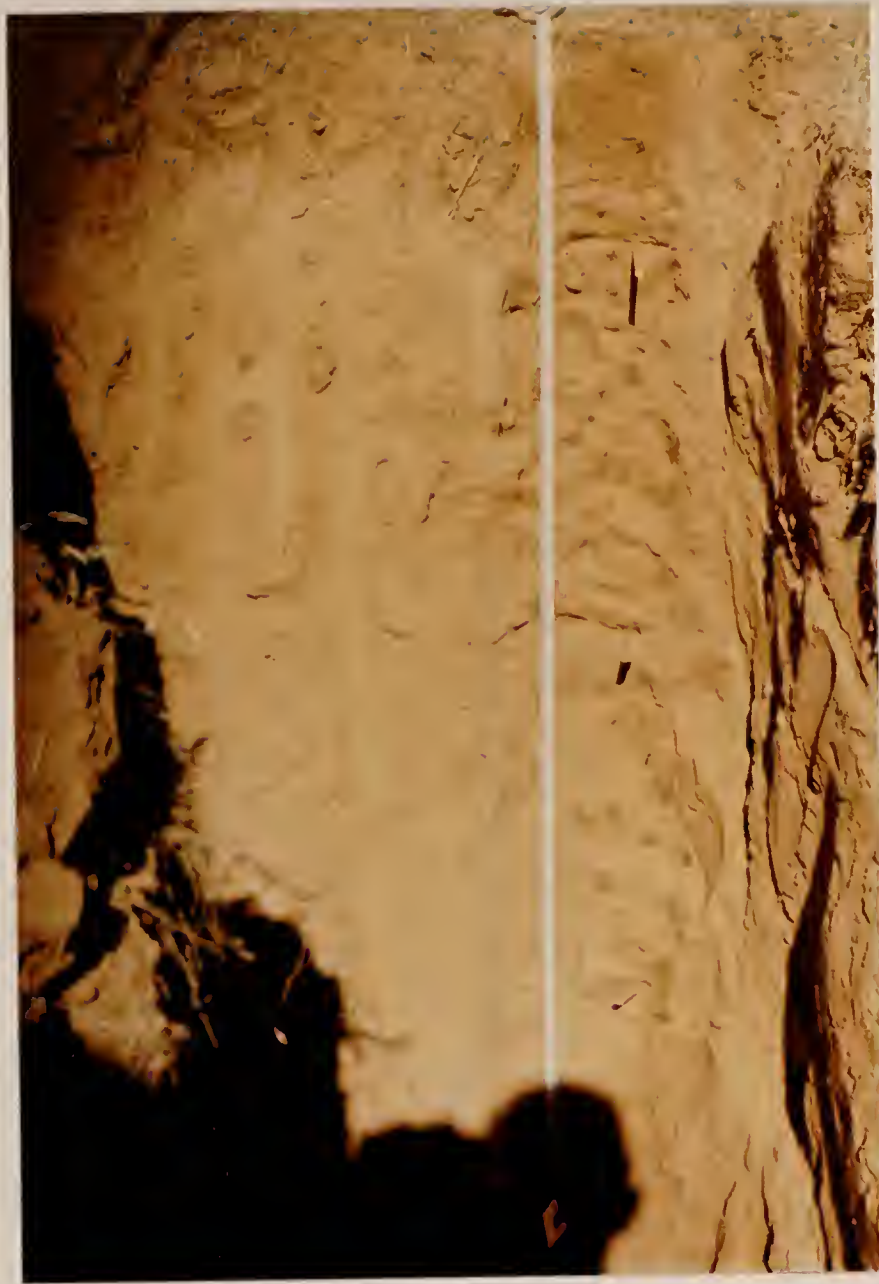
C3--40 to 60 inches; reddish brown (2.5YR 5/4) very fine sandy loam, dark reddish brown (2.5YR 3/4) when moist; weak, coarse subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine, and fine roots; common very fine, and fine few medium pores; moderately calcareous, lime is disseminated; strongly alkaline (pH 8.7)

The A1 horizon has hue of 7.5YR or 5YR, value 4 or 5 when the soils are dry and 3 or 4 when they are moist; and chroma of 4 through 6. It is fine sandy loam, but ranges to very fine sandy loam. The C horizon has colors similar to the A horizon. It is very fine sandy loam that is marginal to fine sandy loam. In many places, strata of sandy loam, silt loam and fine sand occur in the C horizon.

Soil suitability for range seeding is poor because of only 10 to 12 inches of precipitation. Plant species generally recommended for seeding are crested wheatgrass, Indian ricegrass and Siberian wheatgrass. Other plant species that grow well in areas with 10 to 12 inches precipitation can be used. Equipment limitations are slight.



RbB Landscape view of Rb fine sandy loam, 2 to 4 percent slopes. The vegetation is dominantly galleta, blue grama, black grama, sand dropseed and fourwing saltbush. Cliff of Navajo sandstone in the background.



RbB Profile of Rb fine sandy loam, 2 to 4 percent slopes. The A1 horizon is about 7 inches thick. C horizon below. Classification is coarse-loamy, mixed, (calcareous) mesic Ustic Torrifluvents



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Rb fine sandy loam (RbB)  
 STATE UTAH RECORD NO.        AUTHOR(S) VLM DATE 3/77 REVISED    UNIT MODIFIER         
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION

THE Rb SERIES CONSISTS OF VERY DEEP, WELL DRAINED SOILS FORMED IN ALLUVIUM FROM SANDSTONE AND SHALE ON ALLUVIAL FANS UNDER GALLETA BLUE GRAMA, GLOBEMALLOW AND FOURWING SALTBRUSH. MAAT IS 53 TO 65 F. AAP IS 10 TO 12 INCHES. FFP IS 165 TO 170 DAYS. A TYPICAL PROFILE HAS A REDDISH BROWN FINE SANDY LOAM SURFACE LAYER 7 INCHES THICK. THE UNDERLYING LAYERS ARE REDDISH BROWN VERY FINE SANDY LOAM TO 60 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.

FOOTNOTES			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. ≥ 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING #20				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
0-7	FSL	SM, SM-SC	A-4	0	100	100	70-95	40-50	15-25	NP-10				
7-60	VFSL	SM-SC, SM, ML, CL-ML	A-4	0	100	100	85-95	50-65	15-25	NP-10				
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	8-15	1.6-1.7	2.0-6.0	0.10-0.14	8.5-9.0	<2	LOW	.28	5	3	.5-2	HIGH	MODERATE	
	8-15	1.5-1.6	2.0-6.0	0.13-0.15	8.5-9.0	<2	LOW	.32						
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTE-TIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL IN.	TOTAL IN.			
NONE			> 6.0			-		> 60		-		B	MODERATE	

FOOTNOTES		SANITARY FACILITIES			KEYING ONLY	FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SLIGHT:				FILL	191		1	GOOD
						2			
						3			
						4			
						5			
SEWAGE LAGOONS	SEVERE: SEEPAGE				SAND	201			UNSUITED
						2			
						3			
						4			
						5			
SANITARY LANDFILL (TRENCH)	MODERATE: SEEPAGE				GRAVEL	211			UNSUITED
						2			
						3			
						4			
						5			
SANITARY LANDFILL (AREA)	MODERATE: SEEPAGE				SOIL	221		1	GOOD
						2			
						3			
						4			
						5			
DAILY COVER FOR LANDFILL	1	GOOD							
					PONDERS	231			
						2			
						3			
						4			
FOOTNOTES		BUILDING SITE DEVELOPMENT						FOOTNOTES	
SHALLOW EXCAVATIONS	SLIGHT:				DIKES	241			SEEPAGE, PIPING
						2			
						3			
						4			
						5			
DWELLINGS WITHOUT BASEMENTS	SLIGHT:				PONDAGE	251			NO WATER
						2			
						3			
						4			
						5			
DWELLINGS WITH BASEMENTS	SLIGHT				DRAIN	261			NOT NEEDED
						2			
						3			
						4			
						5			
SMALL COMMERCIAL BUILDINGS	SLIGHT				IRRIG	271			SLOPE
						2			
						3			
						4			
						5			
LOCAL ROADS AND STREETS	SLIGHT				TERRAC	281			SLOPE
						2			
						3			
						4			
						5			
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS					WATERW				SLOPE
						2			
						3			
						4			
						5			

FOOTNOTES	REGIONAL INTERPRETATIONS



RMF     Rock outcrop-Me complex, very steep

This mapping unit is a complex consisting of about 65 percent Rock outcrop (sandstone); and about 25 percent Me fine sand 10 to 30 percent slopes. Included with this complex in mapping are areas of a shallow, fine sand soil occurring between the Me fine sand and Rock outcrop areas. This complex occurs on terrace breaks.

The Rock outcrop occurs as very steep escarpments and the Me fine sand occurs in more sloping areas of the mapping unit.

The Rock outcrop consists of nearly barren exposures of sandstone. It occurs mainly in the Yellowjacket Canyon Area. The Me sand, 10 to 30 percent slopes is similar to Me fine sand, 2 to 10 percent slopes, described in mapping unit MeD; except the slopes are steeper ranging from 10 to 30 percent, and the length of slope is short. See mapping unit MeD for detailed description of the Me soil.

This complex is not suitable for seeding. Equipment limitations are severe because of the rock and steep slopes.



## SOIL INTERPRETATIONS RECORD

MLRA(S) 35	KIND OF UNIT SERIES	UNIT NAME Me sand (RME)
STATE UTAH	RECORD NO.	AUTHOR(S) VLM
CLASSIFICATION AND BRIEF SOIL DESCRIPTION	DATE 3/77	REVISED UNIT MODIFIER

THE Me SERIES CONSISTS OF VERY DEEP EXCESSIVELY DRAINED SOILS FORMED IN WIND-BLOWN SANDS FROM SANDSTONE ON ROLLING UPLANDS UNDER PINYON PINE, JUNIPER, INDIAN RICEGRASS AND SANDHILL MUHLY. MAAT IS 50 TO 56 F, AAP IS 12 TO 14 INCHES, FFP IS 140 TO 160 DAYS. A TYPICAL PEDON IS A BROWN SAND, 19 INCHES THICK. THE UNDERLYING LAYERS ARE BROWN AND REDDISH BROWN SAND TO 60 INCHES OR MORE. SLOPES ARE 10 TO 30 PERCENT.

FOOTNOTE			ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
A 0-60	S	SP-SM, SM, SP	A-3, A-2	0	100	100	70-95	0-15	0	NP				
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G CM <sup>3</sup> )	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	0-5	1.6-1.7	>20	0.05-0.08	6.1-7.3	<2	LOW	10	5	1	<.5-1	HIGH	MODERATE	
FLOODING				HIGH WATER TABLE			CEMENTED PAV		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			> 6.0			-		> 60		-		A	LOW	

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	B	10-15% MODERATE: SLOPE	FILL	191	ROADFILL	10-15%: GOOD			
		15+%: SEVERE: SLOPE		2		15-25%: FAIR: SLOPE			
				3		25+%: POOR: SLOPE			
				4					
				5					
SEWAGE LAGOONS		SEVERE: SEEPAGE, SLOPE	SAND	201	SAND	POOR: EXCESS FINES			
				2					
				3					
				4					
				5					
SANITARY LANDFILL (TRENCH)		10-25%: SEVERE: SEEPAGE, TOO SANDY	GRAVEL	211	GRAVEL	UNSUITED			
		25+%: SEVERE: SLOPE, SEEPAGE, TOO SANDY		2					
				3					
				4					
				5					
SANITARY LANDFILL (AREA)		10-15%: SEVERE: SEEPAGE	SOIL	221	TOPSOIL	10-15%: POOR: TOO SANDY			
		15+%: SEVERE: SLOPE, SEEPAGE		2		15+%: POOR: SLOPE, TOO SANDY			
				3					
				4					
				5					
DAILY COVER FOR LANDFILL	I	10-15%: POOR: TOO SANDY	PONDERS	231	POND RESERVOIR AREA	SLOPE, SEEPAGE			
		15+%: POOR: SLOPE, TOO SANDY		2					
				3					
				4					
				5					
FOOTNOTES		BUILDING SITE DEVELOPMENT				FOOTNOTES		WATER MANAGEMENT	
SHALLOW EXCAVATIONS		10-15%: SEVERE: CUTBANKS CAVE	DIKES	241	EMBANKMENTS DIKES AND LEVEES	PIPING, SEEPAGE			
		15+%: SEVERE: SLOPE, CUTBANKS CAVE		2					
				3					
				4					
				5					
DWELLINGS WITHOUT BASEMENTS		10-15%: MODERATE: SLOPE	PONDAGE	251	EXCAVATED PONDS AQUIFER FED	NO WATER			
		15+%: SEVERE: SLOPE		2					
				3					
				4					
				5					
DWELLINGS WITH BASEMENTS		10-15%: MODERATE: SLOPE	DRAIN	261	DRAINAGE	NOT NEEDED			
		15+%: SEVERE: SLOPE		2					
				3					
				4					
				5					
SMALL COMMERCIAL BUILDINGS		SEVERE: SLOPE	IRRIG	271	IRRIGATION	SLOPE, SOIL BLOWING, DROUGHTY			
				2					
				3					
				4					
				5					
LOCAL ROADS AND STREETS		10-15%: MODERATE: SLOPE	TERRAC	281	TERRACES AND DIVERSIONS	SLOPE, TOO SANDY			
		15+%: SEVERE: SLOPE		2					
				3					
				4					
				5					
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS			WATERW		GRASSED WATERWAYS	SLOPE, DROUGHTY			
				2					
				3					
				4					
				5					

FOOTNOTES REGIONAL INTERPRETATIONS

UNIT NAME: Me RECREATIONAL DEVELOPMENT  
UNIT MODIFIER:

Me

## RECREATIONAL DEVELOPMENT

## FOOTNOTES

10-15%: SEVERE: TOO SANDY  
15+%: SEVERE: SLOPE, TOO SANDY

KEYING ONLY

PLAYGO 321

2

			3
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		4
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1	5
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PATHS	331
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			2
			2

3	1
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## THE CROPS AND

- FOOTNOTE

SEVERE: SLOPE, TOO SANDY

CAMP AREAS

## PLAYGROUNDS

### PICNIC AREAS

10-15%: SEVERE: TOO SANDY  
15+%: SEVERE: SLOPE TOO SANDY

15+2: SEVERE: SLOPE TOO SANDY

# PATHS AND TRAILS

10-25%: SEVERE: TOO SANDY  
25+%: SEVERE: SLOPE, TOO SANDY

25+%; SEVERE: SLOPE, TOO SANDY

- FLOPOTE

CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

[illegible]

FOOTNOTE

WOODLAND SUITABILITY

[illegible]

PHOTOGRAPH

WINDBREAKS

[illegible]

FOOTNOTE

WILDLIFE HABITAT SUITABILITY

[illegible]

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FOOTNOTE

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)

COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE					
		ALL					
INDIAN RICEGRASS	ORHY	5					
SANDHILL MUHLY	MUPU2	5					
OTHER PERENNIAL GRASSES	PPEGG	10					
OTHER PERENNIAL FORBS	PPFF	10					
ANTELOPE BITTERBRUSH	PUTR2	3					
BIG SAGEBRUSH	ARTR2	7					
GAMBEL OAK	QUGA	7					
PINYON 2/	PIED	15					
UTAH JUNIPER 2/	JUOS	20					
OTHER SHRUBS	SSSS	18					
POTENTIAL PRODUCTION (LBS./AC. DRY WT.):							
FAVORABLE YEARS		1200					
NORMAL YEARS							
UNFAVORABLE YEARS		700					

## FOOTNOTES

SYM.	FOOTNOTES
A	ESTIMATES BASED ON ENGINEERING TEST DATA ON ONE BEDON FOR KANE COUNTY, UTAH
B	POLLUTION MAY BE A HAZARD TO WATER SUPPLIES
1	BORROW AREAS MAY BE DIFFICULT TO REVEGETATE
2	NOT USUALLY UTILIZED BY SHEEP AND CATTLE

SbB    Sa loamy fine sand, 2 to 4 percent slopes

This soil is deep and well drained. It occurs on gently undulating mesas at elevations of 6,600 to 7,100 feet. It formed in residuum from sandstone and limestone of Carmel formation. Average annual precipitation is estimated to be 14 to 17 inches. Mean annual air temperature is 44° to 45° F. The frost-free season is 120 to 140 days. Natural vegetation is blue grama, western wheatgrass, globemallow, big sagebrush, serviceberry and bitterbrush.

This soil occurs mainly in the southeast part of Glendale Bench.

Included with this soil in mapping are small areas of Sa very fine sandy loam, 2 to 4 percent slopes and La very fine sandy loam, 2 to 4 percent slopes.

In a typical profile the surface layer is brown and yellowish brown, loamy fine sand about 11 inches thick. The subsoil is yellowish red heavy fine sandy loam underlain by limestone bedrock at depths of about 47 inches.

Permeability is moderate. Available water capacity is 5 to 8 inches, to a depth of 40 to 60 inches. Organic matter content in the surface layer is low, about 1 percent. Effective rooting depth is 40 to 60 inches or more, but most roots are in the upper 18 inches. Surface runoff is slow and the erosion hazard is slight under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. The Soil Erodibility Factor, "K" value class is .10 in the upper 11 inches and .20 below 11 inches. The Soil Surface Factor (SSF) is .25.

This soil is used for rangeland and wildlife habitat.

This soil has a profile similar to that described for the Sa very fine sandy loam, in mapping unit AkB except the surface layer is loamy fine sand about 11 inches thick.

A representative profile of Sa very fine sandy loam, 2 to 4 percent slopes in mapping unit AkB is used to represent this soil. It occurs 2,500 feet north and 2,400 feet west of the southwest corner of section 27, T. 41 S., R. 7 W. in a rangeland area and is as follows:

A11--0 to 4 inches; brown (10YR 5/3) very fine sandy loam, dark brown (7.5YR 3/3) when moist; single grain; loose, nonsticky, nonplastic; many very fine, few fine and medium roots; mildly alkaline (pH 7.5); abrupt smooth boundary.

A12--4 to 11 inches; brown and dark brown (10YR 4/3) very fine sandy loam, dark brown (7.5YR 3/2) when moist; weak, medium subangular blocky structure that parts to weak fine granular; soft, very friable, nonsticky, nonplastic; few very fine, fine and medium roots; few fine, few medium pores; mildly alkaline (pH 7.7); clear smooth boundary.

A3--11 to 18 inches; brown and dark brown (7.5YR 4/4) very fine sandy loam, dark brown (7.5YR 3/2) when moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few very fine, fine and medium roots; few fine and medium pores; mildly alkaline (pH 7.6); gradual smooth boundary.

B1--18 to 31 inches; (7.5YR 5/4) very fine sandy loam, reddish brown (5YR 4/4) when moist; moderate medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few very fine, fine and medium roots; common very fine, few fine and medium pores; extensively worked by cicada; mildly alkaline (pH 7.5); gradual smooth boundary.

B21t--31 to 41 inches; yellowish red (5YR 5/6) heavy fine sandy loam, reddish brown (5YR 4/4) when moist; strong, medium subangular blocky structure; very hard, firm, sticky, slightly plastic; few very fine and fine roots; few very fine pores; few thin clay films on faces of peds; extensively worked by cicada; mildly alkaline (pH 7.4); gradual wavy boundary.

B22t--41 to 47 inches; yellowish red (5YR 4/6) flaggy heavy fine sandy loam, reddish brown (5YR 4/4) when moist; strong medium subangular blocky structure; very hard, firm, sticky, slightly plastic; few very fine and fine roots; few very fine pores; few thin continuous clay films on faces of peds; extensively worked by cicada, 50 percent limestone fragment; mildly alkaline (pH 7.4); abrupt smooth boundary.

R--47 inches; limestone bedrock.

The A1 horizon has hue of 10YR or 7.5YR, value of 4 or 5 when the soils are dry and 3 when they are moist. It is loamy fine sand or very fine sandy loam. The A1 horizon is 10 to 15 inches thick. The B2t horizon texture is heavy fine sandy loam or sandy clay loam. Depth to limestone bedrock is 40 to more than 72 inches.

Soil suitability for range seeding is poor because of the loamy fine sand surface soil. Plant species generally recommended for seeding are intermediate wheatgrass, Luna Pubescent wheatgrass, Topar Pubescent wheatgrass and western wheatgrass. Other plant species that grow well in areas with 14 to 17 inches precipitation can be used. Equipment limitations are moderate because of the sandy soil.

# SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT SERIES UNIT NAME Sa loamy fine sand (SbB)  
STATE UTAH RECORD NO. AUTHOR(S) VLM, DAL DATE 3/77 REVISED UNIT MODIFIER  
CLASSIFICATION AND PREF SOIL DESCRIPTION

THE 5a SERIES ARE DEEP, WELL DRAINED SOILS FORMED IN RESIDUUM FROM SANDSTONE ON GENTLY SLOPING UNDULATING TERRACES, UNDER GRAMA, WHEATGRASS, AND BIG SAGEBRUSH. MAAT IS 44 TO 45 F. AAP IS 14 TO 17 INCHES. FFP IS 120 TO 140 DAYS. A TYPICAL PEDON HAS A BROWN LOAMY FINE SAND SURFACE LAYER 11 INCHES THICK. THE SUBSOIL IS YELLOWISH RED FINE SANDY LOAM TO 47 INCHES OR MORE. SLOPES ARE 2 TO 4 PERCENT.

[illegible][illegible]

FLOODING			HIGH WATER TABLE			CEMENTED PAH		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			> 6.0			-		40-72	HARD	-		B	MODERATE

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS		MODERATE: DEPTH TO ROCK	FILL	191	ROADFILL		FAIR: LOW STRENGTH, THIN LAYER		
				2					
				3					
				4					
				5					
SEWAGE LAGOONS		MODERATE: SEEPAGE, SLOPE, DEPTH TO ROCK	SAND	201	SAND		UNSUITED:		
				2					
				3					
				4					
				5					
SANITARY LANDFILL (TRENCH)		SEVERE: DEPTH TO ROCK	GRAVEL	211	GRAVEL		UNSUITED:		
				2					
				3					
				4					
				5					
SANITARY LANDFILL (AREA)		SLIGHT:	SOIL	221	TOPSOIL		FAIR: TOO SANDY		
				2					
				3					
				4					
				5					

DAILY COVER FOR LANDFILL	FAIR: DEPTH TO ROCK			FOOTNOTES		WATER MANAGEMENT	
		PONDRS	231	POND RESERVOIR		SEEPAGE, DEPTH TO ROCK	
			2				
			3				

FOOTNOTES		BUILDING SITE DEVELOPMENT		AREA	
SHALLOW EXCAVATIONS	MODERATE: DEPTH TO ROCK	DIKES	241	EMBANKMENTS DIKES AND LEVEES	PIPING
			2		
			3		
			4		
			5		
DWELLINGS WITHOUT BASEMENTS	SLIGHT:	PONDAQ	251	EXCAVATED PONDS AQUIFER FED	NOT WATER
			2		
			3		
			4		
			5		
DWELLINGS WITH BASEMENTS	MODERATE: DEPTH TO ROCK	DRAIN	261	DRAINAGE	NOT NEEDED
			2		
			3		
			4		
			5		
SMALL COMMERCIAL BUILDINGS	SLIGHT:	IRRIG	271	IRRIGATION	FAST INTAKE, SOIL BLOWING, SLOPE
			2		
			3		
			4		
			5		
LOCAL ROADS AND STREETS	MODERATE: LOW STRENGTH, FROST ACTION	TERRAC	281	TERRACES AND DIVERSIONS	SOIL BLOWING
			2		
			3		
			4		
			5		
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS		WATERW		GRADED WATERWAYS	SLOPE
			2		
			3		
			4		
			5		

[illegible]



TbD     Tb sandy loam, 1 to 10 percent slopes

This soil is shallow and well-drained. It occurs on broad mesa tops at elevations of 4,500 to 6,000 feet. This soil formed in materials weathered from conglomerate and sandstone. Slopes range from 1 to 10 percent. The average annual precipitation is 12 to 14 inches; and the mean annual air temperature is 56° to 59° F; the frost-free season is 160 to 170 days. The vegetation is pinyon pine, juniper, sagebrush and grasses.

This soil occurs mainly in the Short Creek Area.

Included with this soil in mapping are small areas of Rb fine sandy loam, 2 to 4 percent slopes.

In a typical profile the surface layer is a reddish-brown sandy loam about 2 inches thick. The subsoil is a yellowish-red gravelly sandy clay loam over conglomerate bedrock at depths of about 16 inches. The soil is noncalcareous throughout. Reaction is mildly to moderately alkaline.

Permeability is moderately slow. The available water holding capacity is about 1.5 to 3 inches above the bedrock. Organic matter content is low about 1.0 percent. Roots penetrate to the bedrock. Surface runoff is medium and erosion hazard is moderate. These soils are used for rangeland, wildlife habitat and recreation.

A representative profile of Bond sandy loam, 1 to 10 percent slopes, described at a point about 600 feet south and 600 feet west of the east 1/4 corner of section 18, T. 42 S., R. 11 W.; on Gooseberry Mountain in Washington County in a rangeland area follows:

A1--0 to 2 inches; reddish brown (5YR 4/4) sandy loam, dark reddish brown (5YR 3/4) when moist; weak, medium, granular structure loose, very friable, nonsticky and nonplastic; many fine and medium roots; mildly alkaline (pH 7.4); abrupt, smooth boundary.

B1t--2 to 4 inches; reddish brown (5YR 5/4) gravelly sandy clay loam; reddish brown (5YR 4/4) when moist; weak, medium, subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; common fine vesicular pores; few, thin, clay films in pores; about 20 percent gravel; mildly alkaline; (pH 7.8); clear, smooth boundary.

B2t--4 to 16 inches; yellowish red (5YR 4/6) gravelly sandy clay loamy, yellowish red (5YR 3/6) when moist; moderate, medium, subangular blocky structure; hard, firm, sticky, slightly plastic; common fine and medium roots; few coarse roots; common fine, and very fine vesicular pores; few thin clay films in pores and bridges between sand grains; 25 percent gravel; moderately alkaline; (pH 8.0); abrupt smooth boundary.

R--16 inches; conglomerate bedrock.

Depth to bedrock ranges from 10 to 20 inches. Commonly, gravel covers about 30 percent of the surface. These soils are noncalcareous. Reaction ranges from neutral to moderately alkaline. The A horizon has hue of 5YR or 7.5YR; value of 4 or 5 when the soils are dry and chroma of 2 through 4. It is dominantly sandy loam, but ranges to fine sandy loam, or gravelly sandy loam. Gravel content ranges from 0 to 30 percent. The A horizon is 1 to 3 inches thick. The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5 when the soils are dry, and chroma is 4 through 8. It is dominantly sandy clay loam, but ranges to clay loam or gravelly sandy clay loam. Gravel content ranges from 10 to 25 percent. The B2t horizon ranges from 3 to 13 inches thick.

Soil suitability for seeding is very poor because of the shallow soil and very low water holding capacity.

## SOIL INTERPRETATIONS RECORD

MLRA(S) <b>35</b>		KIND OF UNIT <b>SERIES</b>		UNIT NAME <b>Tb sandy loam (TbD)</b>	
STATE <b>UTAH</b>		RECORD NO. <b></b>		AUTHOR(S) <b>VLM</b>	
CLASSIFICATION AND DESCRIPTION		DATE <b>3/77</b>		REVISED <b></b> UNIT MODIFIER <b></b>	

THE Tb SERIES CONSISTS OF SHALLOW WELL DRAINED SOILS FORMED IN RESIDUUM FROM CONGLOMERATE AND SANDSTONE ON UPLAND MESAS UNDER GALLETIA, GRAMA, INDIAN, RICEGRASS, BIG SAGEBRUSH, PINYON AND JUNIPER. MAT IS 56 TO 59 F., AAP IS 12 TO 14 INCHES, FFP IS 160 TO 170 DAYS, THE SURFACE LAYER IS REDDISH BROWN SANDY LOAM 2 INCHES THICK, THE SUBSOIL IS YELLOWISH RED GRAVELLY SANDY CLAY LOAM 14 INCHES THICK OVER BEDROCK. SLOPES ARE 1 TO 10 PERCENT.

ESTIMATED SOIL PROPERTIES											
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHO	FRACT. < 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX	
					4	10	40	200			
0-16	SL, GR-SCL	SM-SC, SC	A-2, A-4, A-6	0-5	70-90	60-85	50-75	30-50	25-30	5-15	
16	UWB										

DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
SAME DEPTH AS ABOVE	18-25	1.6-1.8	0.2-0.6	0.13-0.16	7.4-8.4	<2	MODERATE	.28	1	3	1-2	HIGH	MODERATE

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6.0					10-20	HARD	-		D	MODERATE

FOOTNOTES				SANITARY FACILITIES				KEYING ONLY				FOOTNOTES				CONSTRUCTION MATERIAL											
SEPTIC TANK ABSORPTION FIELDS				SEVERE: DEPTH TO ROCK, PERCS SLOWLY				FILL				191				ROADFILL											
												2															
												3															
												4															
												5															
SEWAGE LAGOONS				1-7%: SEVERE: DEPTH TO ROCK				SAND				201				SAND											
				7+%: SEVERE: DEPTH TO ROCK SLOPE								2															
												3															
												4															
												5															
SANITARY LANDFILL (TRENCH)				SEVERE: DEPTH TO ROCK				GRAVEL				211				GRAVEL											
												2															
												3															
												4															
												5															
SANITARY LANDFILL (AREA)				1-8%: SLIGHT				SOIL				221				TOPSOIL											
				8+%: MODERATE: SLOPE								2															
												3															
												4															
												5															
DAILY COVER FOR LANDFILL				POOR: THIN LAYER, AREA RECLAIM												FOOTNOTES				WATER MANAGEMENT							
												PONDERS												231			
																								2			
																								3			
																								4			
SHALLOW EXCAVATIONS				SEVERE: DEPTH TO ROCK				DIKES				241				EMBANKMENTS DIKES AND LEVEES											
												2															
												3															
												4															
												5															
DWELLINGS WITHOUT BASEMENTS				SEVERE: DEPTH TO ROCK				PONDAQ				251				EXCAVATED PONDS AQUIFER FED											
												2															
												3															
												4															
												5															
DWELLINGS WITH BASEMENTS				SEVERE: DEPTH TO ROCK				DRAIN				261				DRAINAGE											
												2															
												3															
												4															
												5															
SMALL COMMERCIAL BUILDINGS				1-8%: SEVERE: DEPTH TO ROCK				IRRIG				271				IRRIGATION											
				8+%: SEVERE: SLOPE, DEPTH TO ROCK								2															
												3															
												4															
												5															
LOCAL ROADS AND STREETS				SEVERE: DEPTH TO ROCK				TERPAC				281				TERPACES AND DIVERGERS											
												2															
												3															
												4															
												5															
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS								WATER#								GRASSED WATERWAYS											
												2															
												3															
												4															
												5															

FOOTNOTES		REGIONAL INTERPRETATIONS	

UNIT NAME: Tb  
UNIT MODIFIER.

## RECREATIONAL DEVELOPMENT

- FOOTNOTE

CAMP MODIFIER	FOOTNOTE	KEYING ONLY		FOOTNOTE
CAMP AREAS	1-8%: SLIGHT	PLAYGROUNDS	321	1-6%: SEVERE: DEPTH TO ROCK
	8+%: MODERATE: SLOPE		2	6+%: SEVERE: SLOPE, DEPTH TO ROCK
			3	
			4	
			5	
PICNIC AREAS	1-8%: SLIGHT	PATHS	331	SLIGHT:
	8+%: MODERATE: SLOPE		2	
			3	
			4	
			5	

## CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

[illegible]

WOODLAND SUITABILITY

[illegible]

## WINDBREAKS

[illegible]

## WILDLIFE HABITAT SUITABILITY

[illegible]

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)

COMMON PLANT NAME	PLANT SYMBOL (NLSN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS-DETERMINING PHASE			
		ALL			
BLUEGRAMA	BOGR2	5			
DRYLAND SEDGE	CAREX	8			
INDIAN RICEGRASS	ORHY	8			
NEEDLEANDTHREAD	STCO4	5			
OTHER PERENNIAL GRASSES	PPGG	24			
OTHER PERENNIAL FORBS	PPFF	5			
ANTELOPE BITTERSUSH	PUTR2	5			
BIG SAGEBRUSH	ARTR2	5			
BLACK SAGEBRUSH	ARARN	5			
GREENLEAF MANZANITA 1/	ARPA6	5			
MORMON TEA	EPHD	5			
SERVICEBERRY	AMAL2	5			
PINYON 1/	PIED	5			
UTAH JUNIPER 1/	JUQS	5			
OTHER SHRUBS	SSSS	5			
TOTAL TAC PRODUCTION (LBS./AC. DRY WT)					
FAVORABLE YEARS		1200			
NORMAL YEARS					
UNFAVORABLE YEARS		500			

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FOOTNOTES

UJF     Typic Ustorthents, fine-loamy, mixed, (calcareous), frigid  
         steep

This soil is moderately deep and well drained. It occurs on steep mountain slopes at elevations of 6,400 to 7,100 feet. It formed in residuum from shale, siltstone and sandstone. Slopes are 10 to 40 percent. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 44° to 45° F., and the frost-free season is 120 to 140 days. Natural vegetation is Indian ricegrass, serviceberry, bitterbrush, Oregon grape, pinyon pine and Utah juniper.

This soil occurs mainly in the Black Knolls - Bald Knoll Area.

Included with this soil in mapping are small areas of Ea fine sand, 15 to 40 percent slopes; areas of a similar soil with bedrock less than 20 inches; and small areas of Rock outcrop.

In a typical profile the surface layer is brown, gravelly clay loam and clay loam about 5 inches thick. The underlying layer is light brownish gray clay loam over shale bedrock at depths of about 29 inches.

Permeability is slow. Surface runoff is medium and the erosion hazard is moderate. The available water holding capacity is 2 to 5 inches above the bedrock.

This soil is used for rangeland and wildlife habitat.

A representative profile of the Typic Ustorthents, fine-loamy, mixed, (calcareous) frigid, steep in section 21, T. 40 S., R. 5 W. in a cultivated area follows:

A11--0 to 2 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 4/3) when moist; moderate, fine and medium granular structure; slightly hard, friable, sticky, plastic; few, very fine and fine roots; common very fine and fine pores; 35 percent gravel, 10 percent cobble, 1 percent stone; moderately calcareous, lime is disseminated; moderately alkaline (pH 8.0); clear, smooth boundary.

A12--2 to 5 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) when moist; moderate fine granular structure; slightly hard, friable, sticky, plastic; common very fine and fine, few medium and coarse roots; common very fine and fine pores; 15 percent gravel; moderately calcareous, lime is disseminated; moderately alkaline (pH 8.2); clear wavy boundary.

C1--5 to 29 inches; light brownish gray (2.5Y 6/3) clay loam, grayish brown (2.5Y 5/2) when moist; moderate fine subangular blocky structure; hard, firm, sticky, plastic; few very fine, fine medium and coarse roots; few fine pores; 5 percent gravel; moderately calcareous, lime is disseminated; moderately alkaline (pH 8.0); gradual smooth boundary.

R--29 inches; shale bedrock.

Depth to shale bedrock ranges from 20 to 40 inches. Texture of the surface layer ranges from gravelly clay loam to very gravelly clay loam or stony loam. The C horizon ranges from clay loam or loam to silt loam or silty clay loam. In places, it is gravelly. Coarse fragments range from 5 to 30 percent. The underlying shale bedrock, in places, is weathered and cracked with a few roots extending into the cracks.

Soil suitability for seeding is poor because of the steep slope and low water holding capacity of the soil. Equipment limitations are moderate, because of slope and cobbly soils.

# SOIL INTERPRETATIONS RECORD

MIRA(S) 35 KIND OF UNIT FAMILY UNIT NAME TYPIC USTORTHERTS (UJF)  
 STATE UTAH REPORT NO. 1 AUTHOR(S) VLM DATE 3/77 REVISED 1 UNIT MODIFIER fine-loamy, mixed, (calc) frigid, steep  
 CLASSIFICATION AND BATTLE DESCRIPTION

THE TYPIC USTORTHERTS, FINE LOAMY, MIXED, (CALCAREOUS) FRIGID FAMILY, CONSISTS OF MODERATELY DEEP, WELL DRAINED SOILS FORMED IN RESIDUUM FROM SHALE SILTSTONE AND SANDSTONE ON STEEP MOUNTAIN SLOPES UNDER INDIAN RICEGRASS, SERVICEBERRY, PINYON AND JUNIPER. MAAT IS 44 TO 45 F. AAP IS 14 TO 16 INCHES. FFP IS 120 TO 140 DAYS. A TYPICAL PROFILE HAS A BROWN GRAVELLY CLAY LOAM SURFACE LAYER 5 INCHES THICK. THE UNDERLYING LAYER IS LIGHT BROWNISH GRAY CLAY LOAM 24 INCHES THICK OVER SHALE BEDROCK. SLOPES ARE 10 TO 40 PERCENT.

FOOTNOTE		ESTIMATED SOIL PROPERTIES								
DEPTH (IN)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. + 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLAS- TICITY INDEX
					4	10	40	200		
0-5	GR-CL, CL	SC, GC, CL	A-6	0-10	60-80	50-70	40-60	35-55	30-40	10-15
5-29	CL	CL, SC	A-6	0-5	75-90	60-80	50-70	35-60	30-40	10-15
29	UWB									

DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	S-RINK-SWELL POTENTIAL	EROSION FACTORS K T	WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSION	
- SAME DEPTH AS ABOVE	28-35	1.4-1.6	.06-0.2	0.14-0.18	7.9-8.4	<2	LOW	28 2	8	1-2	STEEL	CONCRETE
	28-35	1.4-1.6	.06-0.2	0.15-0.18	7.9-8.4	<2	LOW	28			HIGH	MODERATE

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			> 6.0					20-40	HARD	-		D	MODERATE

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY	FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	10-15%: SEVERE: DEPTH TO ROCK, PERCS SLOWLY			FILL 191	ROADFILL			10-25%: POOR: THIN LAYER, AREA RECLAIM
	15+%: SEVERE: DEPTH TO ROCK, PERCS SLOWLY, SLOPE			2				25+%: POOR: THIN LAYER, SLOPE, AREA RECLAIM
				3				
				4				
				5				
SEWAGE LAGOONS	SEVERE: DEPTH TO ROCK, SLOPE			SAND 201	SAND			UNSUITED
				2				
				3				
				4				
				5				
SANITARY LANDFILL (TRENCH)	10-25%: SEVERE: DEPTH TO ROCK			GRAVEL 211	GRAVEL			UNSUITED
	25+%: SEVERE: DEPTH TO ROCK, SLOPE			2				
				3				
				4				
				5				
SANITARY LANDFILL (AREA)	10-15%: MODERATE: SLOPE			SOIL 221	TOPSOIL			10-15%: FAIR: TOO CLAYEY, SMALL STONES, SLOPE
	15+%: SEVERE: SLOPE			2				15+%: POOR: SLOPE
				3				
				4				
				5				
DAILY COVER FOR LANDFILL	10-15%: POOR: THIN LAYER, AREA RECLAIM			PONDERS 231	POND RESERVOIR AREA			DEPTH TO ROCK, SLOPE
	15+%: POOR: THIN LAYER, SLOPE, AREA RECLAIM			2				
				3				
				4				
				5				

FOOTNOTES		BUILDING SITE DEVELOPMENT		KEYING ONLY	FOOTNOTES		WATER MANAGEMENT	
SHALLOW EXCAVATIONS	10-15%: SEVERE: DEPTH TO ROCK			DIKES 241	EMBANKMENTS DIKES AND LEVEES			THIN LAYER
	15+%: SEVERE: DEPTH TO ROCK, SLOPE			2				
				3				
				4				
				5				
DWELLINGS WITHOUT BASEMENTS	10-15%: MODERATE: DEPTH TO ROCK, SLOPE			PDNDQ 251	EXCAVATED POND AQUIFER FEQ			NO WATER
	15+%: SEVERE: SLOPE			2				
				3				
				4				
				5				
DWELLINGS WITH BASEMENTS	10-15%: SEVERE: DEPTH TO ROCK			DRAIN 261	DRAINAGE			NOT NEEDED
	15+%: SEVERE: DEPTH TO ROCK, SLOPE			2				
				3				
				4				
				5				
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE			IRRIG 271	IRRIGATION			PERCS SLOWLY, ROOTING DEPTH, SLOPE
				2				
				3				
				4				
				5				
LOCAL ROADS AND STREETS	10-15%: SEVERE: DEPTH TO ROCK			TERFAC 281	TERFACES AND DIVERSIONS			SLOPE, DEPTH TO ROCK, PERCS SLOWLY
	15+%: SEVERE: DEPTH TO ROCK, SLOPE			2				
				3				
				4				
				5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW	GRASSSED WATERWAYS			SLOPE, ROOTING DEPTH, DEPTH TO ROCK
				2				
				3				
				4				
				5				

FOOTNOTES	REGIONAL INTERPRETATIONS

[illegible]

XJH     Typic Ustorthents, sandy-skeletal, mixed, (calcareous),  
mesic, very steep

This soil is moderately deep and somewhat excessively drained. It occurs on very steep, south facing escarpment breaks at elevations of 6,400 to 7,100 feet. Slopes are 40 to 80 percent. This soil formed in residuum from sandstone. Average annual precipitation is estimated to be 15 to 16 inches. Mean annual air temperature is 46° to 48° F., and the average frost-free season is 130 to 150 days. Natural vegetation is Indian rice-grass, bitterbrush, yellowbrush, serviceberry, pinyon pine and Utah juniper.

This soil occurs mainly in the Black Knoll - Bald Knoll Area.

Included with this soil in mapping are small areas of Ea fine sand, 15 to 40 percent slopes, and small areas of Typic Ustorthents, fine-loamy, mixed, (calcareous), frigid, steep soils; and small areas of Rock outcrop and areas that are less than 20 inches to consolidated bedrock.

In a typical profile the surface layer is pale yellow, loamy fine sand about 4 inches thick. The underlying layer is pale yellow very channery loamy fine sand, soft, somewhat weathered sandstone at a depth of about 32 inches.

Permeability is moderately rapid. Runoff is rapid and the erosion hazard is high. The available water capacity is 1 to 3 inches above the bedrock.

This soil is used for rangeland and wildlife habitat.

A representative profile of the Typic Ustorthents, sandy-skeletal, mixed, (calcareous), mesic, shallow, very steep soils about 2,000 feet north and 1,350 feet west of the southeast corner of section 30, T. 40 S., R. 5 W. in a wildlife area follows:

A1--0 to 4 inches; pale yellow (2.5Y 7/4) loamy fine sand, light olive brown (2.5Y 5/4) when moist; single grain, loose, nonsticky, nonplastic; common very fine, few fine roots; slightly calcareous, lime is disseminated; mildly alkaline (pH 7.8); clear, smooth boundary.

C1--4 to 10 inches; pale yellow (2.5Y 7/4) channery loamy fine sand, light yellowish brown (2.5Y 6/4) when moist; rock structure; slightly hard, loose, nonsticky, nonplastic; common very fine, fine and medium roots; 40 percent soft sandstone fragments and gravels; slightly calcareous, lime is disseminated; mildly alkaline (pH 7.6); clear wavy boundary.

C2--10 to 32 inches; pale yellow (2.5Y 7/4) very channery loamy fine sand, light yellowish brown (2.5Y 6/4) when moist; rock structure; slightly hard, friable, nonsticky, nonplastic; few very fine, fine and medium roots; 85 percent sandstone fragments; slightly calcareous, lime is disseminated; mildly alkaline (pH 7.5); abrupt wavy boundary.

R--32 to 53 inches; weathered sandstone.

Depth to soft sandstone is highly variable, ranging from 10 to 40 inches, within a few feet of horizontal distance. The A1 horizon is dominantly loamy fine sand or channery and very channery fine sandy loam, but in places, ranges to channery loam or very channery fine sand. The C horizon is channery loamy fine sand to very channery fine sandy loam or very channery fine sand. The A and C horizons has hue of 10YR, 2.5Y or 5Y, value of 5 through 8 when the soils are dry and 5 through 7 when they are moist. The A1 horizon contains 0 to 30 percent rock fragments. The C horizon increases from the above amounts to 50 to 90 percent rock fragments dominantly of soft sandstone material.

Soil suitability for seeding is poor because of the very steep slopes and shallow soils with very low water holding capacity. Equipment limitations are severe because of very steep slopes.

## SOIL INTERPRETATIONS RECORD

MLRA(S) 35 KIND OF UNIT FAMILY UNIT NAME TYPIC USTORTHERENTS (XJH)  
 STATE UTAH RECORD NO.        AUTHOR(S) VLM DATE 3/77 REVISED    UNIT MODIFIER sandy-skeletal, mixed, (calc) mesic,  
 CLASSIFICATION AND BRIEF SOIL DESCRIPTION very steep

THE TYPIC USTORTHERENTS SANDY-SKELETAL, MIXED, (CALCAREOUS), MESIC FAMILY CONSISTS OF MODERATELY DEEP SOMEWHAT EXCESSIVELY DRAINED SOILS FORMED IN RESIDUUM FROM SANDSTONE ON VERY STEEP ESCARPMENT BREAKS UNDER INDIAN RICEGRASS, SERVICEBERRY, PINYON AND JUNIPER. MAINT. IS 46 TO 48 F., AAP IS 15 TO 16 INCHES; FFP IS 130 TO 150 DAYS. IN A TYPICAL PROFILE THE SURFACE LAYER IS PALE YELLOW, LOAMY FINE SAND 4 INCHES THICK, THE UNDERLYING LAYER IS PALE YELLOW, VERY CHANNERY LOAMY FINE SAND 28 INCHES THICK OVER SANDSTONE. SLOPES ARE 40 TO 80 PERCENT.

DEPTH (IN)		USDA TEXTURE	UNIFIED		AASHO		FRACT. < 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX	
								4	10	40	200			
0-4		LFS	SM		A-1, A-2		0	80-90	50-60	25-45	10-20	-	NP	
4-32		CNV-LFS	GM, GP-GM		A-1		40-85	30-50	20-30	15-20	5-15	-	NP	
32		UWB												
DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G/CM <sup>3</sup> )	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY		
								K	T			STEEL	CONCRETE	
SAME DEPTH AS ABOVE	5-12	1.6-1.8	2.0-6.0	0.07-0.08	7.4-7.8	2-4	LOW	.15	2	2	.5-1	HIGH	MODERATE	
	3-12	1.7-2.0	2.0-6.0	0.04-0.05	7.4-7.8	2-4	LOW	.15						
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)			
NONE			>6.0			-		20-40	HARD	-		B	LOW	

FOOTNOTES		SANITARY FACILITIES		KEYING ONLY		FOOTNOTES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SEVERE: DEPTH TO ROCK, SLOPE			FILL	191	ROADFILL	POOR: LARGE STONES, THIN LAYER, SLOPE		
					2				
					3				
					4				
					5				
SEWAGE LAGOONS	SEVERE: DEPTH TO ROCK, SLOPE			SAND	201	SAND	UNSUITED		
					2				
					3				
					4				
					5				
SANITARY LANDFILL (TRENCH)	SEVERE: DEPTH TO ROCK, SLOPE, SEEPAGE			GRAVEL	211	GRAVEL	UNSUITED		
					2				
					3				
					4				
					5				
SANITARY LANDFILL (AREA)	SEVERE: SEEPAGE, SLOPE			SOIL	221	TOPSOIL	POOR: LARGE STONES, SLOPE		
					2				
					3				
					4				
					5				
DAILY COVER FOR LANDFILL	POOR: THIN LAYER, LARGE STONES, SLOPE					POND RESERVOIR AREA	SEEPAGE, DEPTH TO ROCK, SLOPE		
				PONDERS	231				
					2				
					3				
					4				
FOOTNOTES		BUILDING SITE DEVELOPMENT					WATER MANAGEMENT		
SHALLOW EXCAVATIONS	SEVERE: DEPTH TO ROCK, LARGE STONES, SLOPE			DIKES	241	EMBANKMENTS DIKES AND LEVEES	THIN LAYER, PIPING, LARGE STONES		
					2				
					3				
					4				
					5				
DWELLINGS WITHOUT BASEMENTS	SEVERE: SLOPE, LARGE STONES			PONDAQ	251	EXCAVATED PONDS AQUIFER FED	NO WATER		
					2				
					3				
					4				
					5				
DWELLINGS WITH BASEMENTS	SEVERE: DEPTH TO ROCK, SLOPE, LARGE STONES			DRAIN	261	DRAINAGE	NOT NEEDED		
					2				
					3				
					4				
					5				
SMALL COMMERCIAL BUILDINGS	SEVERE: SLOPE, LARGE STONES			IRRIG	271	IRRIGATION	LARGE STONE, DROUGHTY, SLOPE		
					2				
					3				
					4				
					5				
LOCAL ROADS AND STREETS	SEVERE: SLOPE, LARGE STONES			TERRAC	281	TERRACES AND DIVERSIONS	LARGE STONES, SLOPE, DEPTH TO ROCK		
					2				
					3				
					4				
					5				
LAWNS, LANDSCAPING, AND GOLF FAIRWAYS				WATERW		GRASSED WATERWAYS	LARGE STONES, SLOPE, DROUGHTY		
					2				
					3				
					4				
					5				
FOOTNOTES		REGIONAL INTERPRETATIONS							
FOOTNOTES									

FOOTNOTES
1. NOT USUALLY UTILIZED BY SHEEP AND CATTLE

#### Z4 Tc-Cinder land complex, 40 to 60 percent slopes

This mapping unit is a complex consisting of nearly equal proportions of Tc very gravelly loam, 40 to 60 percent slopes, and Cinder land. The Tc soil and Cinderland occur in an intermixed pattern. They occur as large, steep cone shaped areas of cinders ejected by volcanic activity.

Included within this complex in mapping are small areas of Lava flows.

The Tc very gravelly loam, 40 to 60 percent slopes soil is deep and well drained. It occurs on cinder cone slopes and formed in material weathered from volcanic cinders. Elevations range from 6,200 to 6,500 feet. Average annual precipitation is 14 to 17 inches. Mean annual air temperature is 43° to 45° F., and the frost-free season is 120 to 140 days. Natural vegetation is Indian ricegrass, big sagebrush, bitterbrush, Utah juniper and pinyon pine.

This complex occurs near the Black Knoll.

In a typical profile the surface layer is reddish brown, very gravelly loam about 11 inches thick. The subsoil is reddish brown, very gravelly clay loam and very gravelly loam about 15 inches thick. The substratum is reddish brown, very cobbly sandy loam to a depth of 60 inches or more.

Permeability is moderately rapid. Available water capacity is 3.5 to 5 inches to a depth of 5 feet or more. Organic matter content in the surface layer is low, about 1.5 percent. Effective rooting depth is 60 inches or more, but most roots are in the upper 26 inches. Surface runoff is medium and the erosion hazard is moderate under potential vegetation, but if the vegetation is removed and the soil is left bare the erosion hazard is high. The Soil Erodibility Factor "K" value class is .20 in the upper 11 inches and .17 below 7 inches. The Soil Surface Factor (SSF) is 51.

This soil is used for wildlife habitat.

A representative profile of Tc very gravelly loam, 40 to 60 percent slopes, in section 27, T. 40 S., R. 6 W. in a wildlife area follows:

A11--0 to 2 inches; reddish brown (5YR 4/3) very gravelly loam, dark reddish brown (5YR 3/2) when moist; weak, medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; common medium and many fine pores; 65 percent gravel, 5 percent cobble, 5 percent stone; mildly alkaline (pH 7.6); clear smooth boundary.

A12--2 to 11 inches; reddish brown (5YR 4/3) very gravelly loam, dark reddish brown (5YR 3/2) when moist; moderate, medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine, few medium and coarse roots; few fine and medium pores;

50 percent gravel, 5 percent cobble, 5 percent stone; mildly alkaline (pH 7.4); gradual smooth boundary

B21t--11 to 17 inches; reddish brown (5YR 4/4) very gravelly clay loam, reddish brown (5YR 4/3) when moist; moderate, medium subangular blocky structure; hard, firm, sticky, plastic; common very fine and fine, few medium and coarse roots; few fine and medium pores; thin continuous clay films in pores; 30 percent gravel, 10 percent cobble, 10 percent stone; noncalcareous; mildly alkaline (pH 7.6); gradual, wavy boundary.

B22t--17 to 26 inches; reddish brown (5YR 5/3) very gravelly loam, reddish brown (5YR 4/3) when moist; moderate, medium subangular blocky structure; hard, firm, sticky, plastic; common very fine and fine, few medium and coarse roots; few very fine, fine and medium pores; thin continuous clay films in pores; 40 percent gravel, 10 percent cobble, 10 percent stone; mildly alkaline (pH 7.6); gradual wavy boundary.

C1--26 to 60 inches; reddish brown (5YR 5/4) very cobbly sandy loam, reddish brown (5YR 4/4) when moist; weak, medium subangular blocky structure; loose, very friable, nonsticky, nonplastic; few very fine, fine, medium and large roots; 30 percent gravel, 40 percent cobble, 10 percent stones; moderately alkaline (pH 8.0).

The Cinder land is composed of scoriaceous cinders deposited as very steep sided cone shaped formations. It is very porous, has a loose consistency and a very low water holding capacity. Very little vegetation is established.

Soil suitability for seeding is very poor because of the very steep slopes.

# SOIL INTERPRETATIONS RECORD

MI (R/S) 35 KIND OF UNIT SERIES UNIT NAME Tc very gravelly loam (Z4)  
 STATE UTAH COUNTY MO. AUTHOR(S) VLM DATE 3/77 REVISED UNIT MODIFIER  
 CLASSIFICATION AND DESCRIPTION

THE Tc SERIES CONSISTS OF DEEP, WELL DRAINED SOILS FORMED IN VOLCANIC CINDERS ON CINDER CONE SLOPES, UNDER INDIAN RICEGRASS, BIG SAGEBRUSH, JUNIPER AND PINYON. MAAT IS 43 TO 45F. AAP IS 14 TO 17 INCHES. EFP IS 120 TO 140 DAYS. A TYPICAL PROFILE HAS A REDDISH BROWN VERY GRAVELLY LOAM SURFACE LAYER 11 INCHES THICK. THE SUBSOIL IS REDDISH BROWN VERY GRAVELLY CLAY LOAM 15 INCHES THICK. THE SUBSTRATUM IS REDDISH BROWN VERY COBBLY SANDY LOAM TO 60 INCHES OR MORE. SLOPES ARE 40 TO 60 PERCENT.

## ESTIMATED SOIL PROPERTIES

DEPTH (IN)	USCA TEXTURE	UNIFIED	AASHTO	FRACT. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 3 IN. PASSING SIEVE				LIQUID LIMIT	PLASTICITY INDEX
					4	10	40	200		
0-11	GRV-L	GM-GC	A-1, A-2	0-5	30-50	25-40	20-35	10-25	25-30	5-10
11-60	GRV-CL, GRV-L, CBV-SL	GM-GC	A-1, A-2	20-40	25-40	20-35	15-25	10-20	25-30	5-10

DEPTH (IN)	CLAY (PCT OF <2MM)	MOIST BULK DENSITY (G CM³)	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (pH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
								K	T			STEEL	CONCRETE
SAME DEPTH AS ABOVE	8-20	1.6-1.7	2.0-6.0	0.07-0.08	7.4-7.8	<2	LOW	.20	1	8	1-2	HIGH	MODERATE
	5-18	1.6-1.7	2.0-6.0	0.06-0.08	7.4-8.4	<2	LOW	.17					

FLOODING			HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD GRP	POTENTIAL FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INITIAL (IN)	TOTAL (IN)		
NONE			>6.0					>60				A	LOW

FOOTNOTES	SANITARY FACILITIES	KEYING ONLY	FOOTNOTES	CONSTRUCTION MATERIAL
	SEVERE: SLOPE	FILL 191		SEVERE: SLOPE
		2		
		3		
		4		
		5		
	SEVERE: SEEPAGE, SLOPE	SAND 201		UNSUITED
		2		
		3		
		4		
		5		
	SEVERE: SEEPAGE, SLOPE	GRAVEL 211		UNSUITED
		2		
		3		
		4		
		5		
	SEVERE: SEEPAGE, SLOPE	SOIL 221		POOR: SMALL STONES, SLOPE
		2		
		3		
		4		
		5		

FOOTNOTES	DAILY COVER FOR LANDFILL	FOOTNOTES	WATER MANAGEMENT
	POOR: SMALL STONES, SLOPE, SEEPAGE		
		POND 231	SEEPAGE, SLOPE
		2	
		3	
		4	
		5	

FOOTNOTES	BUILDING SITE DEVELOPMENT	FOOTNOTES	EMBANKMENTS DIKES AND LEVEES
	SEVERE: SLOPE	DIKES 241	SEEPAGE
		2	
		3	
		4	
		5	
	SEVERE: SLOPE	POND 251	NO WATER
		2	
		3	
		4	
		5	
	SEVERE: SLOPE	DRAIN 261	NOT NEEDED
		2	
		3	
		4	
		5	
	SEVERE: SLOPE	IRR 271	SMALL STONES, DROUGHTY, SLOPE
		2	
		3	
		4	
		5	
	SEVERE: SLOPE	TERRACE 281	LARGE STONES, SLOPE
		2	
		3	
		4	
		5	
		WATER 291	LARGE STONES, SLOPE, DROUGHTY
		2	
		3	
		4	
		5	

FOOTNOTES	REGIONAL INTERPRETATIONS



Z6 Dune land

This mapping unit consists of ridges and the intervening troughs made up of sand-sized particles that shift with the wind. It is essentially devoid of vegetation, but in places, some plants get established for short periods of time. Slopes are short and broken. Runoff is very slow. The major area of this mapping unit is included in the Coral Pink Sand Dunes State Park.



Z6 Landscape view of mapping unit Z6 -- Duneland in Coral Pink Sand Dunes State Park.

## Z9    Lava flows

This miscellaneous area is composed of lava that flowed from nearby extinct volcanoes. It has a very uneven topography with sharp jagged surfaces and many crevices and pockets.

This mapping unit occurs mainly in the Black Knoll- Bald Knoll Area.

Wind deposited soil material has accumulated in some of the smoother areas and a soil has developed similar to Ca cobbly very fine sandy loam, 0 to 4 percent slopes; except the surface is extremely stony, and depth to bedrock is 15 to 20 inches or less. These areas make up about 10 percent of mapping unit. Also included are small areas of Tc very gravelly loam, 40 to 60 percent slopes and small areas of Cinder land.

Galleta, blue grass, sand dropseed, bitterbrush, Gambel oak, big sagebrush, Utah juniper and pinyon pine has been established on these included areas. Very little use is made of this vegetation by livestock because of the surrounding uneven topography of the Lava flow material.

## SOIL CLASSIFICATION

<u>Series Symbol</u>	<u>Classification</u>
Aa	Fine-loamy, mixed Pachic Argiborolls
Ba	Fine-loamy, mixed Typic Argiborolls
Ca	Loamy-skeletal, mixed Typic Argiborolls
Da	Coarse-loamy, mixed, mesic Fluventic Haplustolls
Ea	Mixed, Frigid Typic Ustipsamments
Ga	Fine-loamy, mixed, (calcareous), mesic Ustic Torrifluvents
Ha	Sandy, mixed, mesic Ustic Torrifluvents
Ja	Coarse-loamy, mixed Pachic Argiborolls
Ka	Loamy-skeletal, mixed Entic Haploborolls
La	Coarse-loamy, mixed Typic Argiborolls
Ma	Mixed, mesic Ustic Torripsamments
Mb	Mixed, frigid Typic Ustipsamments
Mc	Mixed, mesic Ustic Torripsamments
Me	Mixed, mesic Ustic Torripsamments
Mt	Sandy-skeletal, mixed, mesic Ustic Torriorthents
Pa	Coarse-loamy, mixed, mesic Ustollic Haplargids
Rb	Coarse-loamy, mixed, (calcareous), mesic Ustic Torrifluvents
Sa	Coarse-loamy, mixed Typic Argiborolls
Tc	Loamy-skeletal, mixed Typic Argiborolls
Tb	Loamy, mixed, mesic Lithic Ustollic Haplargids
(UJ)	Fine-loamy, mixed, (calcareous), frigid Typic Ustorthents
(XJ)	Sandy-skeletal, mixed, (calcareous), mesic Typic Ustorthents
(KV)	Loamy-skeletal, mixed, (calcareous), mesic Lithic Ustorthents
(KV)	Loamy-skeletal, mixed, Lithic Haploborolls

## LABORATORY DATA

The soil analyses were made by the Utah State University Soil-Plant-Water Analyses Laboratory.

The analyses were made using standard procedures. The samples were air-dried in the laboratory.

They were then passed through round, 2 millimeter openings of sieves. Some samples with less than 5 percent of pebbles or stones, were poured through a mechanical crusher that has openings about 4 millimeters in diameter. Other samples that contained an appreciable amount of pebbles or stones were broken up in an iron mortar without crushing the pebbles or stones. If necessary, a Riffle sampler was used to reduce the size of the sample. Each laboratory sample was mixed thoroughly to insure uniformity, and after this mixing all analyses were made of the fractions that were less than 2 millimeters in diameter. The percentage of material greater than 2 millimeters in size was calculated by dividing the weight of the fraction retained in the 2 millimeters sieve by the initial weight of the air-dry sample. Subsamples less than 2 millimeters in diameter were ground small enough to pass a 60 mesh sieve. A mortar and pestle were used for the grinding. These subsamples were used to determine organic carbon and the calcium carbonate equivalent.

The reaction, or pH, was measured with a line-operated pH meter, using a glass electrode with a calomel reference electrode. To determine the pH of soil-water suspensions in a ratio of 1 to 5, the suspensions were stirred vigorously immediately before the electrodes were inserted. At the first indication of stabilization, the pH was read; then, the process was repeated until duplicate readings were obtained. Distilled water, or water free of carbon dioxide was used for all soil-water suspensions.

The organic carbon was determined by wet oxidation methods in which chromic acid is used as described in 90.3-.2 agronomy annual series number 9. Silver sulfate was added to the sulfuric acid to prevent oxidation of chlorides. The organic carbon was determined by colorimetry using a curve prepared from soils of known organic carbon content.

The macro-Kjeldahl method was used to determine total nitrogen, and selenium metal was used as a catalyst in the digestion mixture. Enough water (about 15 to 20 milliliters) was added to the soil and digestion mixture in the flask to thoroughly wet the material before adding the acid for digestion. The distilled ammonia was caught in boric acid solution of 2 percent that contained a specially mixed indicator of bromocresol green and new coccine. This solution was titrated with standard solution (1/14 N) of sulfuric acid.

A pipette cell that had platinized platinum electrodes, in which the cell constant was 0.5, was used with a resistance bridge to measure the electrical conductivity of the saturation extract. The cell was equipped with a tapping key switch so that excessive flow of electric current was avoided. An excessive flow of current could have heated the solution or polarized the electrodes. All values for electrical conductivity are expressed in millimhos per centimeter at 25° C.

The calcium carbonate equivalent was determined by allowing varying weights of sample to react with 2 N Hydrochloric acid in constant-volume glass containers. The percentage of lime was determined with manometer readings that were referred to a curve showing percentages for standard samples of calcium carbonate. Calcium carbonate equivalent is expressed as a percentage of  $\text{CaCO}_3$ .

The one-third-atmosphere moisture percentage was determined by using the pressure plate apparatus in which saturated samples of the soil were allowed to come to equilibrium on a porous ceramic membrane at 1/3-atmosphere tension. Sample preparation may have increased the 1/3-bar moisture retention, and the 1/2-bar values may be erroneously high. The 15-atmosphere moisture percentage was determined using the pressure membrane apparatus. As in the 1/3-atmosphere moisture determination, samples of soil were placed in retaining rings 1 centimeter in depth, allowed to saturate with water for at least 16 hours, and then brought to equilibrium at a 15-atmosphere pressure differential. All moisture constants are expressed as percentage of the oven-dry soil.

To find the cation exchange capacity, samples of soil material less than 2 millimeters in diameter were saturated with sodium by four consecutive washings and centrifugations using 1 N sodium acetate solution with pH adjusted to 8.2. Soluble sodium acetate was removed by washing with 95 percent ethanol. The exchangeable sodium was then removed using three consecutive washings with neutral normal ammonium acetate. The sodium was then measured on the flame photometer.

The exchangeable sodium percentage was obtained by the following computation.

$$\text{ESP} = \frac{\text{Exchangeable sodium}}{\text{Cation exchange capacity}} \times 100.$$

All percentage values and milliequivalents per 100 grams were obtained on the basis of oven-dry soil material.

For data in Table 1, the official pipette method of analysis was used to determine particle-size distribution. Organic matter was destroyed by treating with calcium hypochlorite and heating. Sodium hexametaphosphate was used as the dispersing agent. The sand fractions were determined by mechanical sieving through nested sieves. The pipette method of analysis was used on the material less than 2 millimeters in diameter. The amount of material larger than 2 millimeters is expressed on the basis of the total weight of the air-dry sample. The sand, silt, and clay fractions are expressed on the basis of the oven-dry soil less than 2 millimeters in diameter.

Mineralogy determinations were made using X-ray diffraction techniques.

The spectrographic emission analysis are qualitative.

The soil characterization data are given in Table 1.

There are no significant concentrations of salt in any of the soils sampled. The exchangeable sodium percentage is low for all soils. Soils with significant clay contents have cation exchange capacities associated with kaolinitic and illitic clays. Whereas soils with very small clay contents indicate a higher exchange capacity normally associated with montmorillonitic or vermiculite minerology.

Table 1 - SOIL CHARACTERIZATION DATA

SOIL: Aa clay loam, 2 to 4 percent slopes (AaB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									% 2 mm.	TEXTURAL CLASS			
				VERY CDARSE SAND 2-1	CDARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
4021	32	0-4	A1	.2	.5	2.6	17.0	21.1	28	31	41	0	CL				
4022		4-8	B1	.2	.5	2.4	13.0	13.9	32	38	30	0	CL				
4023		8-17	B21t	:1	.5	2.5	12.7	13.3	29	42	29	0	C				
4024		17-35	B22t	.3	.8	3.3	22.6	16.8	27	29	44	0	CL				
4025		35-49	B3ca	.2	.8	3.8	19.1	16.3	27	23	40	0	CL				
4026		49-65	C1ca	.1	1.0	4.6	24.4	19.0	26	25	49	0	SCL				
4027		65-84	C2	.2	1.0	7.5	35.8	20.7	17	18	65	1	SL				
		pH		ORGANIC MATTER								MOISTURE TENSIONS					
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %		TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTI- VITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	SATU- RATION %	1/10 ATMDS. %	1/3 ATMDS. %	15 ATMDS. %	AIR DRY %		
4021		6.7	7.0	1.41	.12	<.1			.4	<.1	38	28.2	17.9	8.7	1.8		
4022		6.9	7.2	1.26	.10	<.1			.3	.1	44	30.3	22.2	12.3	3.0		
4023		7.4	7.7	1.10	.09	<.1			.5	.2	51	34.4	26.2	13.7	3.2		
4024		7.7	8.1	.80	.06	<.1			.5	5.0	43	29.4	20.4	10.0	2.3		
4025		8.0	8.3	.80	.06	<.1			.4	5.9	44	32.0	23.3	11.5	2.6		
4026		8.2	8.4	.59	.05	<.1			.4	5.1	38	26.9	17.3	8.7	2.3		
4027		8.3	8.5	.32	.03	<.1			.5	4.0	31	20.7	12.5	6.0	1.5		
		EXTRACTABLE CATIONS				SODIUM							MDIST-DENS.				
		CATION EXCHANGE CAPACITY	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %	BASE SATU- RATION %		DRY BULK DENS. g/cc	MAX. DRY DENS. pcf	DPT. MDIST. %			
← MILLIEQUIVALENTS PER 100G →																	
4021		12.1	*	1.7	.2	.1	<.1		2	>100		1.6					
4022		15.7		2.3	.2	.9	<.1		1	>100		1.9					
4023		15.7		2.5	.2	.8	<.1		1	>100		1.8					
4024		12.4		1.9	.2	.5	<.1		2	>100		1.9					
4025		13.7		2.7	.3	.7	<.1		2	>100		1.9					
4026		11.1		2.3	.3	.6	<.1		3	>100		1.8					
4027		8.7		2.5	.3	.4	<.1		3	>100		2.0					
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>										CLASSIFICATION							
PERCENTAGE SMALLER THAN										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	AASHO		UNIFIED		
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.								0.02 mm.
4021					100	100	99		70				22	17	5	A-4	CL-ML
4022					100	100	99		82				30	18	12	A-6	CL
4023					100	100	99		81				38	18	20	A-6	CL
4024					100	100	98		65				29	17	12	A-6	CL
4025					100	100	98		68				31	17	14	A-6	CL
4026					100	100	98		61				26	16	10	A-6	CL
4027					100	99	97		43				21	NP	NP	A-4	SM

(1) Calculated on basis of .2mm material  
(2) 5.5 lb Ram, 12 inch drop  
(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Ba very fine sandy loam, 4 to 15 percent slopes (BaD)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
												% >2 mm.					
4002	28	0-2	A11	0	.4	3.2	41.2	35.6	17	3	80	0	LVFS				
4003		2-12	A12	0	.4	3.3	41.3	32.2	12	11	77	0	VFSL				
4004		12-17	B1	0	.3	3.2	37.6	28.8	15	15	70	0	FSL				
4005		17-24	B21t	0	.4	3.6	34.7	24.1	13	24	63	0	SCL				
4006		24-33	B21t	.1	.8	4.8	35.6	16.7	16	26	58	0	SCL				
4007		33-58	B22t	.1	.9	7.2	46.7	16.5	12	16	71	0	FSL				
4008		58-83	B3	.1	1.0	7.9	52.5	14.7	6	18	76	0	FSL				
4009		83-96	C	0	1.9	14.8	58.2	10.1	2	13	85	0	LFS				
		pH		ORGANIC MATTER				ELECTRICAL CONDUCTIVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS							
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %	TOTAL SOLUBLE SALTS %			SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %			
4002		6.7	7.1	.95	.08	<.1		.7	<.1	36	16.5	5.8	3.4	.6			
4003		7.0	7.0	.57	.05	<.1		.3	<.1	29	17.7	6.8	3.3	.7			
4004		6.5	6.8	.37	.05	<.1		.2	<.1	35	22.0	11.0	5.7	1.1			
4005		6.2	6.5	.36	.05	<.1		.2	.1	38	30.3	19.3	10.1	2.0			
4006		6.1	6.5	.40	.05	<.1		.2	<.1	40	30.9	21.4	10.9	2.4			
4007		6.3	6.7	.19	.02	<.1		.3	<.1	33	23.7	14.6	7.3	1.8			
4008		7.4	8.1	.13	.02	<.1		.3	.2	34	23.9	13.9	7.4	2.2			
4009		7.4	7.8	.10	.01	<.1		.3	<.1	27	16.1	9.1	5.0	1.5			
		CATION EXCHANGE CAPACITY ←	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MOIST-DENS.					
			Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %				
← MILLIEQUIVALENTS PER 100G →																	
4002		4.6	4.9	.3	.2	.4	<.1		4	>100	--						
4003		5.0	4.9	.5	.2	.4	<.1		4	>100	1.6						
4004		7.4	5.6	1.1	.2	.6	<.1		3	>100	1.6						
4005		13.7	9.1	1.7	.2	.9	<.1		1	87	--						
4006		14.8	12.8	2.6	.2	.7	<.1		1	>100	1.9						
4007		10.2	7.7	1.4	.2	.5	<.1		2	96	1.9						
4008		12.6	11.4	1.8	.2	.4	<.1		1	>100	1.9						
4009		8.7	6.8	1.4	.2	.3	<.1		2	100	1.8						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>													CLASSIFICATION				
PERCENTAGE SMALLER THAN													LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	AASHO	UNIFIED
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.					
4002				100	100	98		39					NP	NP	NP	A-4	SM
4003				100	100	98		40					NP	NP	NP	A-4	SM
4004				100	100	98		46					19	NP	NP	A-4	SM
4005				100	100	98		50					28	18	10	A-4, A-6	SC, CL
4006				100	100	98		51					30	17	13	A-6	CL
4007				100	100	97		37					23	17	6	A-4	SM
4008				100	100	97		29					20	10	4	A-2	SM
4009				100	100	94		19					19	NP	NP	A-2	SM

(1) Calculated on basis of .2mm material

(2) 5.5 lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Ca cobbly very fine sandy loam, 0 to 4 percent slopes (CaB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
				% >2 mm.													
4010	29	0-2	A11	0	.3	3.8	41.0	40.0	6	9	85	0	LVFS				
4011		2-10	A12	.2	.4	4.5	33.6	30.2	15	16	69	1	VFSL				
4012		10-13	B1	.2	.6	4.9	32.5	28.8	13	20	67	1	FSL				
4013		13-20	B21t	.2	.4	3.9	28.4	28.3	18	21	61	1	SCL				
4014		20-32	B22t	.2	.3	1.3	20.0	28.1	19	31	50	19	SCL				
pH		ORGANIC MATTER						ELECTRICAL CONDUCTIVITY	MOISTURE TENSIONS								
SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %		TOTAL SOLUBLE SALTS %		MILLIMHOS PER CM @25°C	CaCO3 equivalent %	SATU- RATION %	1/10 ATMDS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %			
4010	5.8	6.1	.99	.06	<.1			.5	<.1	33	13.5	4.2	3.2	.5			
4011	6.7	7.0	.68	.06	<.1			.3	<.1	27	16.5	9.0	3.3	.9			
4012	7.1	7.4	.48	.05	<.1			.4	.1	27	17.7	9.7	4.6	1.1			
4013	6.9	7.3	.40	.04	<.1			.4	<.1	32	24.7	14.6	7.2	1.4			
4014	7.0	7.4	.47	.05	<.1			.5	.1	38	32.3	19.8	9.7	1.7			
CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MDIST-DENS.							
	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. p.c.	DPT. MDIST. %						
← MILLIEQUIVALENTS PER 100G →																	
4010	3.8	3.7	.3	.2	.4	<.1		4	>100		--						
4011	4.8	4.0	.6	.2	1.1	<.1		4	>100		1.6						
4012	6.2	4.4	.5	.2	1.5	<.1		3	>100		1.6						
4013	8.7	6.4	1.2	.2	1.6	<.1		2	>100		1.7						
4014	12.5	8.1	1.7	.3	.4	<.1		1	80		1.9						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>											LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION			
PERCENTAGE SMALLER THAN														AASHO	UNIFIED		
1 1/2-in.	1-in.	3/4-in.	3/8-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.						0.005 mm.	0.002 mm.
4010					100	100	98		37				NP	NP	NP	A-4	SM
4011					100	99	98		48				15	NP	NP	A-4	SM
4012					99	99	98		49				15	NP	NP	A-4	SM
4013					99	99	98		52				17	NP	NP	A-4	ML
4014	100	91	87	84	82	81*	80		53				27	14	13	A-6	CL

(1) Calculated on basis of .2mm material

(2) 5.5-lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

135\* almost all of the -#4 fraction disintegrated in solution for wet sieving of finer fractions.

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Da fine sandy loam, 0 to 2 percent slopes (DaA)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
												% >2 mm.					
4015	31	0-6	Ap	.1	2.2	20.0	52.0	11.2	9	6	85	0	FSL				
4016		6-14	A12	.1	.8	7.3	50.3	17.7	8	16	76	0	FSL				
4017		14-29	B2	.3	1.7	11.1	48.6	15.3	9	14	77	0	FSL				
4018		29-35	C1	0	1.4	10.2	54.8	17.5	8	8	84	0	LFS				
4019		35-54	C2	0	.7	10.2	44.5	15.8	12	17	71	0	FSL				
4020		54-68	C3	0	1.0	11.6	66.8	12.9	3	5	92	0	FS				
				pH		ORGANIC MATTER				ELECTRICAL CONDUCTIVITY		MOISTURE TENSIONS					
				SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %	TOTAL SOLUBLE SALTS %	MILLIMHOS PER CM @25°C	CaCO3 equivalent %	SATURATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %	
4015	7.0	7.4	.20	.02	<.1			.3	2.0	24	11.8	5.6	3.4	1.0			
4016	7.3	7.6	.53	.05	<.1			.4	<.1	33	16.6	9.8	6.1	1.3			
4017	7.5	7.6	.31	.03	<.1			.4	.4	30	15.7	8.4	5.3	1.7			
4018	7.7	8.4	.72	.06	<.1			.3	<.1	30	11.9	6.0	3.6	.8			
4019	8.0	8.4	.28	.03	<.1			.4	4.8	30	19.7	11.4	6.0	1.8			
4020	8.4	8.6	.03	.01	<.1			.3	1.7	26	5.8	2.9	1.8	.4			
				EXTRACTABLE CATIONS				SODIUM					MOIST-DENS.				
				CATION EXCHANGE CAPACITY	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %	BASE SATURATION %	DRY BULK DENS. g/cc	(2) MAX. DRY DENS. pcf OPT. MOIST. %			
				MILLIEQUIVALENTS PER 100g													
4015	5.3	*	.6	.2	.2	<.1		4	>100		--						
4016	10.0	8.1	1.1	.2	.8	<.1		2	>100		1.6						
4017	7.8	*	.9	.2	.4	<.1		3	>100		1.7						
4018	5.9	4.9	.5	.2	.9	<.1		3	>100		1.7						
4019	9.2	*	1.0	.2	.3	<.1		2	>100		1.8						
4020	2.9	*	.4	.2	.2	<.1		7	>100		--						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>												CLASSIFICATION					
PERCENTAGE SMALLER THAN												LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	AASHO		UNIFIED
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.				0.002 mm.		
4015					100	100	92		19				NP	NP	NP	A-2	SM
4016					100	100	97		29				20	NP	NP	A-2	SM
4017					100	100	96		30				NP	NP	NP	A-2	SM
4018					100	100	96		26				NP	NP	NP	A-2	SM
4019					100	100	96		34				19	NP	NP	A-2	SM
4020					100	100	96		12				NP	NP	NP	A-2	SM

(1) Calculated on basis of .2mm material

(2) 5.5 lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

\* no meaning in presence of CaCO<sub>3</sub>

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Ea fine sand, 15 to 40 percent slope's (EaG)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
				% >2 mm.													
5329	70	0-4	A1	0	.2	7.5	71.8	9.2	4	7	89	0	FS				
5330		4-11	C1	0	.2	7.8	75.3	8.0	4	5	91	0	FS				
5331		11-26	C2	0	.2	6.8	73.5	9.2	5	5	90	0	FS				
5332		26-50	C2	0	.1	10.8	73.3	7.5	3	5	92	0	FS				
pH		ORGANIC MATTER						ELECTRICAL CONDUCTIVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS							
SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %	TOTAL SOLUBLE SALTS %	SATU- RATION %	1/10 ATMOS. %			1/3 ATMOS. %	15 ATMOS. %	AIR DRY %					
5329	8.0	8.8	.22	.02	<.1			.3	1.0	34	9.6	6.2	4.6	1.1			
5330	8.0	8.7	.09	.01	<.1			.3	1.0	33	9.5	5.9	4.3	1.0			
5331	8.2	9.0	.09	.01	<.1			.3	1.1	31	9.1	5.4	3.7	.7			
5332	8.0	9.0	.06	.01	<.1			.4	1.5	34	10.9	6.5	4.4	1.0			
	CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MDIST-DENS.						
		Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %					
← MILLIEQUIVALENTS PER 100G →																	
5329	7.4	*	.8	.2	.2	<.1		3	--		--						
5330	6.5		1.0	.2	.2	<.1		3	--		1.8						
5331	6.1		1.2	.2	.2	<.1		3	--		--						
5332	7.0		2.0	.2	.2	<.1		3	--		1.8						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>													LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION	
PERCENTAGE SMALLER THAN																AASHO	UNIFIED
1 1/2-in.	1-in.	3/4-in.	3/8-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.					
5329					100	97		16					NP	NP	NP	A-2	SM
5330					100	97		12					NP	NP	NP	A-2	SM, SP-SM
5331					100	98		15					NP	NP	NP	A-2	SM
5332					100	97		12					NP	NP	NP	A-2	SM, SP-SM

- (1) Calculated on basis of 2mm material  
 (2) 12 in. diam, 12 inch drop  
 (3) For clay calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Ga silty clay loam, 0 to 2 percent slopes (GaA)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									TEXTURAL CLASS **				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %	% >2 mm.					
4041	44	0-4	A11	0	.1	.5	3.3	4.4	45	47	8	0	S1C				
4042		4-9	A12	0	0	.3	2.5	4.5	45	48	7	0	S1C				
4043		9-14	C1	0	0	.1	2.1	8.1	55	34	10	0	S1CL				
4044		14-24	C2	0	.2	2.0	19.0	11.3	28	39	33	0	CL				
4045		24-34	C3	0	0	.1	.8	1.3	54	44	2	0	S1C				
4046		34-46	C4	0	0	.5	4.0	1.7	42	52	6	0	S1C				
4047		46-74	C5	.1	1.7	13.1	59.6	12.2	7	6	87	0	LFS				
pH		ORGANIC MATTER						ELECTRICAL CONDUCTIVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS							
SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %		TOTAL SOLUBLE SALTS %	SATU- RATION %			1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %				
4041	7.9	8.2	1.12	.11	<.1			.6	20.5	52	37.1	30.8	16.5	5.1			
4042	7.9	8.4	.85	.08	<.1			.4	21.1	52	37.2	29.5	15.7	3.5			
4043	7.9	8.4	.84	.07	<.1			.5	26.4	48	38.4	27.1	10.5	2.2			
4044	8.1	8.5	.57	.05	<.1			.4	16.9	43	30.4	23.1	11.3	2.4			
4045	8.2	8.5	.71	.06	<.1			.5	25.6	51	39.9	30.7	13.6	2.9			
4046	8.1	8.7	.54	.06	<.1			.5	21.6	58	39.8	32.5	16.2	3.5			
4047	8.5	8.8	.14	.02	<.1			.6	8.5	24	8.5	4.4	2.2	.6			
CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM				BASE SATU- RATION %	DRY BULK DENS. g/cc	MOIST-DENS.						
	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %	(2) MAX. DRY DENS. pcf			OPT. MOIST. %						
← MILLIEQUIVALENTS PER 100G →																	
4041	20.8	*	2.3	.2	3.9	<.1		1	>100		1.4						
4042	20.7		2.2	.2	3.2	<.1		1	>100		1.6						
4043	16.3		2.7	.2	1.5	<.1		1	>100		1.6						
4044	16.5		4.3	.2	1.3	<.1		1	>100		1.7						
4045	20.3		6.1	.3	1.8	<.1		2	>100		1.5						
4046	23.4		6.8	.3	2.6	.1		2	>100		1.7						
4047	4.0		1.4	.2	.5	<.1		5	>100		--						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>											LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION			
PERCENTAGE SMALLER THAN														AASHO	UNIFIED		
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.						0.005 mm.	0.002 mm.
4041				100	100	99		94					40	21	19	A-6, A-7	CL
4042				100	100	100		95					39	21	18	A-6	CL
4043				100	100	100		94					33	18	15	A-6	CL
4044				100	100	99		72					32	16	16	A-6	CL
4045				100	100	100		98					43	24	19	A-7	CL
4046				100	100	100		94					44	22	22	A-7	CL
4047				100	100	95		16					NP	NP	NP	A-2	SM

(1) Calculated on basis of 2mm material

(2) 5.5 lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOILS: Ha silt loam, 0 to 4 percent slopes (HaB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
												>2 mm.					
4034	42	0-1	A11	0	.2	1.3	7.7	19.8	56	15	29	0	Si1				
4035		1-3	A12	0	.4	2.6	12.8	17.6	53	14	33	0	Si1				
4036		3-21	C1	.1	1.9	14.7	46.2	16.4	14	7	79	0	LFS				
4037		21-34	C2	.2	1.8	13.0	58.7	17.3	5	4	91	0	FS				
4038		34-64	C3	.1	2.4	17.7	57.1	15.2	3	4	93	1	FS				
4039		64-66	C4	0	.2	2.2	33.4	27.7	26	10	64	0	FSL				
4040		66-77	C5	0	1.6	17.0	59.2	14.0	4	4	92	0	FS				
		pH		ORGANIC MATTER		GYPSUM %	TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTIV- ITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS							
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %					SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %			
4034	7.8	8.1	2.02	.17	<.1			1.2	20.3	48	41.1	15.7	9.7	1.9			
4035	8.1	8.3	1.08	.09	<.1			.7	19.8	38	33.9	17.8	7.4	1.8			
4036	8.3	8.4	.41	.04	<.1			.5	6.5	25	11.0	5.9	3.1	.6			
4037	8.4	8.7	.13	.02	<.1			.3	4.0	27	5.9	2.8	1.6	.5			
4038	8.5	8.7	.20	.02	<.1			.5	3.8	26	5.3	2.6	1.5	.6			
4039	8.5	8.6	.28	.03	<.1			.7	15.5	34	21.7	10.5	5.5	1.5			
4040	8.5	9.0	.15	.01	<.1			.4	3.5	26	4.9	2.1	1.2	.1			
		CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MOIST-DENS.					
			Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			MAX. DRY DENS. pcf	OPT. MOIST. %				
		← MILLIEQUIVALENTS PER 100G →															
4034	13.4	*	1.7	.2	3.3	<.1		1	>100		--						
4035	10.8		1.4	.2	2.7	<.1		2	>100		--						
4036	4.5		.9	.2	.3	<.1		4	>100		--						
4037	0.9		.5	.2	.2	<.1		--	>100		--						
4038	1.9		.9	.2	.2	<.1		--	>100		--						
4039	7.8		2.4	.2	1.0	<.1		3	>100		1.5						
4040	1.3		.6	.2	.3	<.1		--	>100		--						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION				
PERCENTAGE SMALLER THAN													AASHO	UNIFIED			
1 1/2-in.	1-in.	3/4-in.	3/8-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.						0.02 mm.	0.005 mm.	0.002 mm.
4034					100	100	99		84				31	NP	NP	A-4	ML
4035					100	100	99		77				26	NP	NP	A-4	ML
4036					100	100	94		27				NP	NP	NP	A-2	SM
4037					100	100	94		15				NP	NP	NP	A-2	SM
4038					99	99	93		14				NP	NP	NP	A-2	SM
4039					100	100	99		51				NP	NP	NP	A-2	ML
4040					100	100	93		12				NP	NP	NP	A-2	SM, SP-SM

(1) Calculated on basis of 2mm material

(2) 5.5 lb Ram, 12 Inch drop

(3) Fractions calculated on basis of original sample

\* no meaning in presence of CaCO<sub>3</sub>

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Ja fine sandy loam, 2 to 8 percent slopes (JaC)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
				% >2 mm.													
4052	57	0-4	A11	.5	2.4	12.5	53.0	14.5	12	5	83	0	LFS				
4053		4-13	A12	.8	2.6	11.6	47.6	13.9	16	7	77	0	FSL				
4054		13-24	A13	.3	2.0	11.2	48.2	13.5	15	10	75	0	FSL				
4055		24-32	B21t	.4	1.8	10.8	48.8	12.8	12	13	75	0	FSL				
4056		32-52	B22t	.2	2.5	14.9	52.8	10.7	8	11	81	0	FSL				
4057		52-60	B3	.2	1.6	11.3	52.7	13.1	10	11	79	0	FSL				
pH		ORGANIC MATTER				TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTIVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS								
SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %	SATU- RATION %				1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %					
4052	6.0	6.5	1.39	.08	<.1		.3	<.1	33	13.0	7.6	4.4	.8				
4053	6.5	6.7	.70	.06	<.1		.2	<.1	27	15.9	8.2	3.6	1.0				
4054	6.5	6.9	.42	.04	<.1		.4	<.1	24	16.7	10.0	4.3	.9				
4055	6.4	6.8	.35	.04	<.1		.3	<.1	30	21.8	13.6	6.1	1.4				
4056	6.5	6.7	.19	.02	<.1		.2	<.1	27	17.1	11.2	5.0	1.2				
4057	6.6	6.9	.15	.01	<.1		.2	<.1	28	19.0	11.4	5.0	1.3				
CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MDIST-DENS.							
	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %						
← MILLIEQUIVALENTS PER 100G →																	
4052	5.9	5.2	.7	.1	.8	<.1		2	>100		--						
4053	7.2	5.7	.8	.1	.6	<.1		1	100		1.6						
4054	6.3	5.6	1.0	.1	.9	.1		1	>100		1.7						
4055	8.3	6.5	1.7	.1	.9	.1		1	>100		1.9						
4056	6.3	5.2	1.5	.1	.6	.1		1	>100		1.9						
4057	6.7	5.3	1.5	.1	.5	.1		1	>100		1.9						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION					
PERCENTAGE SMALLER THAN												AASHO	UNIFIED				
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)						0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.
4052					100	94		21					NP	NP	NP	A-2	SM
4053					100	94		26					NP	NP	NP	A-2	SM
4054					100	95		27					15	NP	NP	A-2	SM
4055					100	95		27					24	NP	NP	A-2	SM
4056					100	92		22					NP	NP	NP	A-2	SM
4057					100	95		24					19	NP	NP	A-2	SM

(1) Calculated on basis of .2mm material

(2) 5.5 lb Ram, 12 Inch drop

(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: La very fine sandy loam, 2 to 4 percent slopes (AkB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									% 2 mm.	TEXTURAL CLASS			
				VERY COARSE SAND 2-1	COARSE SAND 1-0.6	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.08-0.002	CLAY <0.002	SAND <2 mm %						
5324	64	0-3	A11	.1	.3	1.9	37.0	38.3	16	7	77	0	VFSL				
5325		3-10	A12	.1	.2	2.0	37.2	38.2	16	7	77	0	VFSL				
5326		10-18	B21t	0	.1	1.4	40.7	32.5	8	17	75	0	VFSL				
5327		18-29	B22t	0	.2	1.9	42.2	30.1	9	17	74	0	VFSL				
5328		29-35	B23t	.3	.6	4.1	41.3	26.1	10	18	72	0	FSL				
		pH		ORGANIC MATTER		GYPSUM %	TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCT- IVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS							
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %					SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %			
5324	6.9	7.2	.89	.09	<.1			.3	<.1	30	12.0	6.3	3.2	.4			
5325	6.8	7.3	.64	.06	<.1			.3	<.1	32	14.4	7.3	4.4	.6			
5326	6.7	7.3	.31	.04	<.1			.2	<.1	35	23.7	14.0	7.1	1.1			
5327	7.0	7.3	.20	.03	<.1			.2	<.1	34	23.1	14.3	7.1	1.2			
5328	6.7	7.4	.23	.03	<.1			.2	<.1	34	23.3	14.7	7.7	1.4			
		CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MDIST-DENS.					
			Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %				
← MILLIEQUIVALENTS PER 100G →																	
5324	5.2	4.4	.8	.1	.3	<.1		2	>100		--						
5325	6.8	6.2	1.2	.2	.4	<.1		3	>100		1.5						
5326	9.5	7.8	1.6	.2	.5	<.1		2	>100		1.6						
5327	9.7	8.3	1.6	.2	.4	<.1		2	>100		1.6						
5328	10.3	9.5	1.7	.1	.5	<.1		1	>100		1.7						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION				
PERCENTAGE SMALLER THAN													AASHO	UNIFIED			
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.						0.02 mm.	0.005 mm.	0.002 mm.
5324					100	99		30					NP	NP	NP	A-2	SM
5325					100	99		37					23	19	4	A-4	SM
5326					100	99		43					NP	NP	NP	A-4	SM
5327					100	99		42					23	21	2	A-4	SM
5328					100	99		37					23	20	3	A-4	SM

(1) Calculated on basis of 2mm material  
(2) 6 to 8 mm, 12 inch drop  
(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Ma fine sand, 4 to 12 percent slopes (MaD)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS					
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %	% >2 mm.						
5334 5335 5336 5337	71	0-5 5-16 16-31 31-65	A11 A12 C1 C2	0 0 0 0	3.4 3.3 3.8 2.6	25.2 24.9 29.4 23.6	52.5 54.8 52.1 51.8	12.2 12.1 9.9 14.4	5 3 4 5	2 2 1 3	93 95 95 92	0 0 0 0	FS FS FS FS					
	pH		ORGANIC MATTER					ELECTRICAL CONDUCT- TIVITY MILLIMHOS PER CM @25°C		MOISTURE TENSIONS								
	SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %		TOTAL SOLUBLE SALTS %		CaCO3 equivalent %	SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %				
5334 5335 5336 5337	7.2 7.1 7.1 7.6	7.4 7.2 7.2 7.9	.19 .15 .10 .12	.02 .01 .01 .01	<.1 <.1 <.1 <.1			.2 .2 .2 .2	<.1 <.1 <.1 <.1	32 28 25 26	5.0 4.3 3.9 4.8	2.9 2.1 1.8 2.3	1.0 1.0 .9 1.1	.1 <.1 <.1 <.1				
	CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MOIST-DENS.							
		Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %						
	← MILLIEQUIVALENTS PER 100g →																	
5334 5335 5336 5337	1.7 1.2 .9 1.1	1.5 1.0 .8 1.2	.2 .1 .1 .2	.1 .1 .1 .1	.1 .1 <.1 .1	<.1 <.1 <.1 <.1		- - - -	>100 >100 >100 >100		-- -- -- --							
	MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>												LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION		
	PERCENTAGE SMALLER THAN															AASHO	UNIFIED	
	1 1/2-in.	1-in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.						0.002 mm.
5334 5335 5336 5337						100 100 100 100	90 90 88 90		11 9 8 11					NP NP NP NP	NP NP NP NP	NP NP NP NP	A-2 A-3 A-3 A-2	SP-SM SP-SM SP-SM SP-SM

(1) Calculated on basis of 2mm material

(2) 5.5 lb Ham, 12 inch drop

(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOILS: Mc fine sand, 2 to 10 percent slopes (McD)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
												% >2 mm.					
5338	72	0-4	A1	0	.8	14.7	60.4	18.4	4	2	94	0	FS				
5339		4-22	C1	0	.7	14.3	65.3	16.5	2	1	97	0	FS				
5340		22-36	C2	0	.6	14.1	62.9	18.5	2	2	96	0	FS				
5341		36-44	C3	0	.5	9.6	63.9	21.7	2	2	96	0	FS				
5342		44-55	C4	0	.4	7.4	60.5	26.8	3	2	95	0	FS				
5343		55-78	C5	0	1.1	20.0	54.9	16.8	4	3	93	0	FS				
pH		ORGANIC MATTER						ELECTRICAL CONDUCTIVITY	MOISTURE TENSIONS								
SATURATED PASTE	1:5	ORGANIC CARBON	NITROGEN	GYPSUM		TOTAL SOLUBLE SALTS		MILLIMHOS PER CM @25°C	CaCO3 equivalent	SATURATION	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.	AIR DRY			
		%	%	%		%			%	%	%	%	%	%			
5338	7.2	7.4	.26	.02	<.1			.3	<.1	28	6.2	2.6	1.2	<.1			
5339	7.1	7.2	.05	.01	<.1			.2	<.1	27	4.4	1.7	.9	<.1			
5340	7.1	7.3	.05	.01	<.1			.2	<.1	27	4.5	1.5	.8	<.1			
5341	7.2	7.2	.12	.01	<.1			.2	<.1	29	5.8	2.0	1.1	<.1			
5342	7.1	7.2	.04	.01	<.1			.2	<.1	30	5.4	2.2	1.2	<.1			
5343	7.3	7.3	.07	.01	<.1			.2	<.1	26	5.9	2.4	1.3	.1			
CATION EXCHANGE CAPACITY		EXTRACTABLE CATIONS				SODIUM						MDIST-DENS.					
		Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %	BASE SATURATION		DRY BULK DENS.	(2) MAX. DRY DENS. OPT. MOIST.					
		← MILLIEQUIVALENTS PER 100G →															
5338	1.3	1.2	.3	.1	.1	<.1			>100		--						
5339	.7	.5	.1	.1	.1	<.1			>100		--						
5340	.6	.4	.1	.2	<.1	<.1			>100		--						
5341	1.0	1.0	.1	.2	.1	<.1			>100		--						
5342	1.1	.7	.1	.1	.1	<.1			91		--						
5343	1.4	1.0	.1	.1	.1	<.1			93		--						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION				
PERCENTAGE SMALLER THAN													AASHO	UNIFIED			
1 1/2-in.	1-in.	3/4-in.	3/8-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.						0.02 mm.	0.005 mm.	0.002 mm.
5338					100	95		11					NP	NP	NP	A-2	SP-SM
5339					100	95		8					NP	NP	NP	A-3	SP-SM
5340					100	95		9					NP	NP	NP	A-3	SP-SM
5341					100	97		9					NP	NP	NP	A-3	SP-SM
5342					100	97		12					NP	NP	NP	A-2	SP-SM
5343					100	94		10					NP	NP	NP	A-2	SP-SM

(1) Calculated on basis of 2mm material

(2) 5 lb item, 12 inch drop

(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Me sand, 2 to 10 percent slopes (MeD)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %	>2 mm.					
75-3986	16	0-2	A11	0	3.4	35.1	46.3	8.3	6	1	93	0	S				
3987		2-9	A12	0	4.8	39.2	42.4	7.2	4	2	93	0	S				
3988		9-21	C1	0	5.0	42.7	43.1	5.1	3	1	96	0	S				
3989		21-30	C2	0	5.2	42.3	44.5	5.5	0	2	98	0	S				
3990		30-48	C3	0	5.4	47.9	41.0	3.7	1	1	98	0	S				
3991		48-70	C4	0	11.2	53.6	32.9	1.7	1	0	99	0	S				
		pH		ORGANIC MATTER								MOISTURE TENSIONS					
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %		TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTIVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %		
3986		5.3	5.7	.55	.04	<.1			.6	<.1	21	5.3	2.9	1.1	.1		
3987		5.9	6.3	.32	.02	<.1			.1	<.1	22	5.0	1.7	1.0	.2		
3988		6.4	7.2	.20	.02	<.1			.1	<.1	22	3.8	1.6	1.0	.2		
3989		6.6	7.2	.22	.01	<.1			.1	<.1	23	2.4	1.2	.8	.2		
3990		6.7	7.6	.14	<.01	<.1			.2	<.1	21	1.8	.8	.6	.1		
3991		7.0	7.6	.18	<.01	<.1			.1	<.1	21	1.4	.8	.5	.1		
		EXTRACTABLE CATIONS				SODIUM								MOIST-DENS.			
		CATION EXCHANGE CAPACITY	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %	BASE SATU- RATION %		DRY BULK DENS. g/cc	MAX. DRY DENS. pcf	OPT. MOIST. %			
← MILLIEQUIVALENTS PER 100G →																	
3986		1.8	.7	.1	.2	.2	<.1		--	63		--					
3987		1.7	1.0	.1	.1	.1	<.1		--	76		--					
3988		1.3	1.0	.1	.4	.1	<.1		--	>100		--					
3989		0.9	.8	.1	.5	<.1	<.1		--	>100		--					
3990		0.5	.4	<.1	.2	<.1	<.1		--	>100		--					
3991		0.4	.3	<.1	.2	<.1	<.1		--	>100		--					
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>											CLASSIFICATION						
PERCENTAGE SMALLER THAN											LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	AASHO	UNIFIED		
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.425 mm.)	No. 60 (0.25 mm.)	No. 200 (0.075 mm.)	0.05 mm.	0.02 mm.						0.005 mm.	0.002 mm.
3986				100	100	87		9					NP	NP	NP	A-3	SP-SM
3987				100	100	90		9					NP	NP	NP	A-3	SP-SM
3988				100	100	83		6					NP	NP	NP	A-3	SP-SM
3989				100	100	83		5					NP	NP	NP	A-3	SP
3990				100	100	81		3					NP	NP	NP	A-3	SP
3991				100	100	80		1					NP	NP	NP	A-3	SP

(1) Calculated on basis of 2mm material

(2) 5.5 lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Pa loamy fine sand, 2 to 4 percent slopes (PbB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)								% > 2 mm.	TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND < 2 mm %						
3996	26	0-5	A1	0	3.1	20.4	36.9	24.1	12	3	85	0	LFS				
3997		5-11	B21t	0	2.3	15.7	33.2	23.1	15	11	74	0	FSL				
3998		11-14	B22t	0	1.6	14.2	30.1	16.9	20	17	63	0	FSL				
3999		14-21	C1ca	0	1.7	15.3	32.9	18.7	18	13	69	0	FSL				
4000		21-30	C2	0	2.9	20.4	31.9	20.4	13	11	76	0	FSL				
4001		30-60	C3	0	2.1	14.6	30.1	27.4	17	9	74	0	FSL				
pH		ORGANIC MATTER		GYPSUM %	TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTI- VITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS									
SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %					SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %					
3996	7.0	7.1	.38	.05	<.1		.6	<.1	24	12.7	4.1	2.1	.6				
3997	7.6	8.1	.32	.03	<.1		.4	.1	25	17.7	8.2	4.4	1.6				
3998	7.9	8.5	.34	.04	<.1		.3	2.7	30	21.8	12.2	6.2	1.7				
3999	8.0	8.6	.28	.03	<.1		.3	3.4	30	18.5	9.8	4.8	1.1				
4000	8.0	8.4	.16	.02	<.1		.3	1.0	23	16.6	6.9	3.5	1.0				
4001	8.1	8.5	.14	.02	<.1		.3	.8	26	17.4	6.2	3.1	.7				
	CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MDIST-DENS.						
		Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %					
← MILLIEQUIVALENTS PER 100G →																	
3996	2.8	2.8	.5	.2	.5	<.1		6	>100	--							
3997	5.8	5.9	1.3	.2	1.3	<.1		3	>100	1.5							
3998	9.2	*	1.6	.2	1.4	<.1		2	>100	1.6							
3999	7.0	*	1.6	.2	1.0	<.1		3	>100	1.6							
4000	4.8	*	1.3	.2	.7	<.1		4	>100	1.7							
4001	4.1	*	1.4	.2	.5	<.1		5	>100	--							
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>											LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION			
PERCENTAGE SMALLER THAN														AASHO	UNIFIED		
1 1/2-in.	1-in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.						0.005 mm.	0.002 mm.
3996					100	100	90		29				NP	NP	NP	A-2	SM
3997					100	100	93		39				NP	NP	NP	A-4	SM
3998					100	100	94		47				19	NP	NP	A-4	SM
3999					100	100	94		42				17	NP	NP	A-4	SM
4000					100	100	91		37				NP	NP	NP	A-4	SM
4001					100	100	94		39				NP	NP	NP	A-4	SM

(1) Calculated on basis of .2mm material

(2) 5.5 lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

145 \* No meaning in presence of CaCO<sub>3</sub>

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Sa very fine sandy loam, 2 to 4 percent slopes (AkB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (percent) (1)									TEXTURAL CLASS						
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %								
												% >2 mm.							
75-5318	63	0-4	A11	.1	.4	2.7	39.7	34.3	14	9	77	0	VFSL						
5319		4-11	A12	.1	.4	2.8	39.3	33.5	15	9	76	0	VFSL						
5320		11-18	A3	.0	.3	4.2	36.3	33.2	15	11	74	0	VFSL						
5321		18-31	B1	0	.2	2.9	40.0	31.9	12	10	75	0	VFSL						
5322		31-41	B21t	0	.2	2.1	42.4	33.4	8	14	78	0	VFSL						
5323		41-47	B22t	.2	.3	2.4	40.0	29.8	9	18	73	0	FSL						
		pH		ORGANIC MATTER		GYPSUM %	TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTIV- ITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS									
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %					SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %					
5318	7.2	7.5	.78	.06	<.1		.7	<.1	39	--	non-wettable		.4						
5319	7.6	7.7	.63	.05	<.1		.6	<.1	30	9.1	4.2	2.4	.4						
5320	7.3	7.6	.35	.04	<.1		.3	<.1	30	11.5	5.6	3.3	.5						
5321	7.3	7.5	.20	.03	<.1		.3	<.1	32	13.9	6.8	3.5	.5						
5322	6.9	7.4	.12	.02	<.1		.2	<.1	32	21.3	11.7	5.6	1.0						
5323	7.1	7.4	.21	.02	<.1		.4	<.1	36	26.3	15.5	7.5	1.3						
		CATION EXCHANGE CAPACITY ←	EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MOIST-DENS.							
			Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS. pcf	OPT. MOIST. %						
		← MILLIEQUIVALENTS PER 100G →																	
5318	3.9	4.4	.8	.2	.5	<.1		5	>100		--								
5319	4.0	3.7	.6	.1	.6	<.1		3	>100		1.5								
5320	4.6	3.9	.6	.2	.5	<.1		4	>100		1.4								
5321	4.8	4.0	.8	.2	.2	<.1		4	>100		1.7								
5322	6.8	5.9	1.2	.2	.2	<.1		3	>100		1.7								
5323	9.5	9.1	1.8	.2	.3	<.1		2	>100		1.7								
		MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>												CLASSIFICATION					
		PERCENTAGE SMALLER THAN												AASHO	UNIFIED				
		1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.			0.002 mm.	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
5318							100	99		23					NP	NP	NP	A-2	SM
5319							100	98		24					NP	NP	NP	A-2	SM
5320							100	99		27					NP	NP	NP	A-2	SM
5321							100	99		29					NP	NP	NP	A-2	SM
5322							100	99		40					21	NP	NP	A-2	SM
5323							100	99		41					24	20	4	A-4	SM

- (1) Calculated on basis of .2mm material  
 (2) 5.5 lb Ram, 12 Inch drop  
 (3) Fractions calculated on basis of original sample

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: Rb fine sandy loam, 2 to 4 percent slopes (RbB)

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)									TEXTURAL CLASS				
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <2 mm %						
												% >2 mm.					
3992	25	0-7	A1	.2	1.7	9.3	31.2	26.9	22	9	69	0	FSL				
3993		7-25	C1	0	.9	5.5	26.2	29.7	29	9	62	0	VFSL				
3994		25-40	C2	.2	1.4	6.1	29.4	30.0	25	8	67	0	VFSL				
3995		40-60	C3	.1	.6	5.1	29.0	29.0	26	10	64	0	VFSL				
pH		ORGANIC MATTER						ELECTRICAL CONDUCT- TIVITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS							
SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %	GYPSUM %	TOTAL SOLUBLE SALTS %	SATU- RATION %	1/10 ATMOS. %			1/3 ATMOS. %	15 ATMOS. %	AIR DRY %					
3992	7.6	8.5	.43	.04	<.1			.6	4.3	27	21.1	8.7	4.3	1.0			
3993	7.8	8.7	.27	.03	<.1			.4	5.4	30	23.4	10.4	5.2	1.6			
3994	8.0	8.7	.19	.02	<.1			.3	5.8	29	20.4	8.6	4.5	1.3			
3995	8.2	8.7	.25	.02	<.1			.3	6.2	29	24.8	10.3	4.9	1.6			
		EXTRACTABLE CATIONS				SODIUM			BASE SATU- RATION %	DRY BULK DENS. g/cc	MDIST-DENS.						
CATION EXCHANGE CAPACITY ←	Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %	(2) MAX. DRY DENS. p-f			OPT. MOIST. %						
	← MILLIEQUIVALENTS PER 100G →																
3992	7.8	*	.9	.2	2.1	<.1		2	>100		1.7						
3993	10.4	*	1.1	.2	.9	<.1		2	>100		--						
3994	9.2	*	2.4	.2	.6	<.1		2	>100		1.5						
3995	10.0	*	3.2	.2	.8	<.1		2	>100		1.6						
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION				
PERCENTAGE SMALLER THAN													AASHO	UNIFIED			
1 1/2-in.	1-in.	3/4-in.	3/8-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.						0.02 mm.	0.005 mm.	0.002 mm.
3992					100	100	93		44				18	NP	NP	A-4	SM
3993					100	100	98		54				21	NP	NP	A-4	ML
3994					100	100	96		50				17	NP	NP	A-4	SM, ML
3995					100	100	97		52				19	NP	NP	A-4	ML

(1) Calculated on basis of .2mm material

(2) 5.5 lb Ram, 12 inch drop

(3) Fractions calculated on basis of original sample

147 \* No meaning in presence of CaCO<sub>3</sub>

Table 1 - SOIL CHARACTERIZATION DATA (cont.)

SOIL: XJ

LABORATORY NUMBER	COLLECTOR'S NUMBER	DEPTH IN INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (In mm.) (percent) (1)								TEXTURAL CLASS			
				VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY <0.002	SAND <.2 mm %				
											% >2 mm.				
4048	53	0-4	A1	.8	3.3	10.3	52.7	17.6	4	11	85	0	LFS		
4049		4-10	C1r	.9	4.6	13.1	51.5	15.9	5	10	85	0	LFS		
4050		10-32	C2r	1.8	4.2	12.0	52.1	14.8	5	10	85	0	LFS		
4051		32-53	R	.9	3.5	10.8	52.9	16.1	5	11	84	0	LFS		
		pH		ORGANIC MATTER		GYPSUM %	TOTAL SOLUBLE SALTS %	ELECTRICAL CONDUCTIV- ITY MILLIMHOS PER CM @25°C	CaCO3 equivalent %	MOISTURE TENSIONS					
		SATURATED PASTE	1:5	ORGANIC CARBON %	NITROGEN %					SATU- RATION %	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	AIR DRY %	
4048		7.5	7.8	.25	.02	<.1		1.6	2.8	35	12.4	7.5	4.0	1.3	
4049		7.5	7.6	.13	.02	1.7		2.2	3.0	35	13.9	8.5	4.4	2.0	
4050		7.4	7.5	.10	.01	1.6		2.3	2.6	33	13.6	8.6	4.5	1.8	
4051		7.3	7.5	.08	.01	.9		2.2	1.8	25	14.5	9.3	4.7	1.6	
		CATION EXCHANGE CAPACITY ←	EXTRACTABLE CATIONS				SODIUM			BASE SAT'N RATION %	DRY BULK DENS. g/cc	MDIST-DENS.			
			Ca	Mg	Na	K	WATER SOLUBLE Na	EXCH. Na	EXCH. Na %			(2) MAX. DRY DENS pcf	OPT. MOIST. %		
← MILLIEQUIVALENTS PER 100G →															
4048		7.6	*	.2	.2	.3	<.1	3	>100		--				
4049		7.6		.1	.2	.2	<.1	3	>100		--				
4050		7.2		.1	.1	.2	<.1	1	>100		2.0				
4051		6.7		.2	.1	.3	<.1	1	>100		2.0				
MECHANICAL ANALYSIS (ENGINEERING) <sup>3</sup>										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CLASSIFICATION		
PERCENTAGE SMALLER THAN													AASHO	UNIFIED	
1 1/2 in.	1 in.	3/4 in.	3/8 in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.						0.02 mm.
4048					100	94		23					NP		
4049					100	92		21					NP		
4050					100	92		20					NP		
4051					100	94		21					NP		

(1) Calculated on basis of .2mm material

(2) 5.6 lb Rem, 12 Inch drop

(3) Fractions calculated on basis of original sample

\* no meaning in presence of CaCO<sub>3</sub>

The data in table 2 shows the available phosphorus content is low in all soils except the Da soils. Based on these analyses phosphates would be needed if legumes are included in seedings.

Nitrate nitrogen is low in all except the Da soils. The Boron content exceeds one part per million in the Ca and Ga soils but is not sufficient to be toxic. The iron, zinc, manganese and copper are at levels normal or a little below for most soils.

Table 2

SPECIAL QUANTITATIVE TEST DATA FOR PHOSPHORUS, IRON, ZINC, COPPER, MANGANESE, NITRATES AND BORON ON SELECTED SOILS

Soil	Depth (inches)	Lab. No.	NaHCO <sub>3</sub> P ppm	Fe	DTPA		Mn	NO <sub>3</sub> -N ppm	B ppm
					Zn	Cu			
Aa	49-65	4026	1.2	2.8	.40	.90	1.96	<.1	.6
Ba	24-33	4006	<1.0	8.8	.48	.80	10.38	<.1	.7
Ca	20-32	4014	6.6	10.2	.90	1.60	7.00	.5	1.5
Da	29-35	4018	12.0	10.0	1.32	.64	4.04	5.6	.9
Ea	26-50	5332	<1.0	1.0	.46	.22	.30	.1	.2
Ga	34-46	4046	<1.0	3.8	.48	1.32	2.28	.1	2.6
Ha	34-64	4038	<1.0	2.8	.44	.52	1.50	2.6	.2
Ja	32-52	4056	7.9	7.4	.50	1.20	2.38	.1	.6
La	18-29	5327	1.8	8.2	.58	.44	5.18	.1	.4
Ma	31-65	5337	1.3	5.2	.32	.30	1.52	.1	.1
Mc	36-44	5341	3.7	5.4	.50	.30	1.20	.1	.1
Me	21-30	3989	<1.0	3.0	.52	.64	.48	.2	<.1
Pa	30-60	4001	<1.0	3.0	.44	1.06	3.74	.1	.5
Rb	25-40	3994	<1.0	1.2	.30	.40	1.34	.2	.6

Table 3 shows the clay mineralogy of selected soil samples to be dominantly kaolinite and illite, except Ma, Mc and Me soils. The latter have very small amounts of clay, dominantly montmorillonitic. These compositions are also reflected in the cation exchange capacities.

Table 3 - CLAY MINERALOGY OF SELECTED SOIL SAMPLES  
AS DETERMINED BY XRAY DIFFRACTION

Soil	Depth (inches)	Lab. No.	Montmor- illonitic	Kaol- inite	Illite	Quartz	Cal- cite	Feld- spar
Aa	49-65	4026	X-1	X-3	?	?	-	?
Ba	24-33	4006	X-1	X-4	X-5	X	-	-
Ca	20-32	4014	<u>1/</u>	X-4	X-1	X	-	-
Da	29-35	4018	X-1	X-3	X-4	?	-	?
Ea	26-50	5332	X-1	-	?	X	-	X
Ga	34-46	4046	X-1	X-4	?	X	-	X
Ha	34-64	4038	X-1	X-3	X-3	?	-	?
Ja	32-52	4056	X-1	X-5	?	X	-	X
La	18-29	5327	X-1	X-5	X-2	X	-	?
Ma	31-65	5337	X-5	X-1	X-5	X	-	-
Mc	36-44	5341	<u>1/</u> (4)	X-3	X-1	X	-	-
Me	21-30	3989	<u>1/</u> (4)	X-1	X-4	X	-	-
Pa	30-60	4001 <sup>2/</sup>	<u>1/</u>	X-4	X-5	?	-	-
Rb	25-40	3994	X-1	X-5	X-3	-	-	X

1/ Montmorillonite peak is not distinct, just a broad plateau.  
Plateau shifts toward 17A position upon glycolation.

2/ Contains mica. Relative abundance about 2.

X The mineral is present in the less than .002 mm. sample

? Possible identification of the mineral.

- No identification made

Table 4 presents qualitative spectrographic analyses of selected soil samples. The array appears normal for soils. Cadmium occurred only in the La soil. Lead is common to most of them. Phosphorus was found in only two soils, but the spectrograph did not pick up phosphorus in the De soil that had highest content of available phosphorus.

Table 4 - QUALITATIVE - SPECTROGRAPHIC ANALYSIS OF SELECTED SAMPLES

(Analysis Made at Utah Engineering Experiment Station - University of Utah)

Element	Aa Soil 49-52" Lab. No. 4026	Ba Soil 24-33" Lab. No. 4006	Ca Soil 20-32" Lab. No. 4014	Da Soil 29-35" Lab. No. 4018	Ea Soil 26-50" Lab. No. 5332	Ga Soil 34-46" Lab. No. 4046	Ha Soil 34-64" Lab. No. 4038	Ja Soil 32-52" Lab. No. 4056	La Soil 18-29" Lab. No. 5327	Ma Soil 31-65" Lab. No. 5339	Mc Soil 36-44" Lab. No. 5341	Me Soil 21-30" Lab. No. 3939	Pa Soil 30-60" Lab. No. 4001	Rb Soil 25-40" Lab. No. 3994
Aluminum	X	X	X	X	X	X	X	X	X	X	X	X-	X	X
Antimony	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Calcium	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chromium	X	X	X	X-	X	X	X-	X-	X	-	-	-	X-	X
Cobalt	X	-	-	-	-	-	X	-	X	-	-	-	-	-
Columbium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Germanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lead	X	X-	X-	X-	X	-	-	-	X	-	X-	-	-	-
Lithium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	X	X	X	X	X	X	X	X	X	X	X	X-	X	X
Manganese	X	X	X	X-	X	X	X	X	X	X-	X	X-	X	X
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	X	-	-	-	-	X	X	X	-	-	-	-	-	-
Nickel	X	X	X	X-	X	X	X	-	X	-	X	-	-	-
Palladium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	X-	X-	-	-	-	-	-	-	-	-	-	-	-
Platinum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	X	X	X	X	X	X	X-	X-	X-	-	X	-	X	X
Ruthenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Silver	-	-	-	-	X-	-	-	-	-	-	X-	-	-	-
Sodium	X	X	X	X	X	X	X-	X	X-	-	-	-	X	X
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	X	X	X	X	X	X	X-	X	X	X	X	-	X	X
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	X	-	-	-	-	X	-	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-

- Means Not Observed

X Means Observed

X- Means Emission Line Barely Discernable



## APPENDIX



# SOIL LIMITATION RATINGS FOR SEPTIC TANK ABSORPTION FIELDS

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None or Protected	Rare	Common
Bedrock	Depth To Rock	>72"	48-72"	< 48"
Cemented Pan	Cemented Pan	>72"	48-72"	< 48"
High Water Table	Wetness	> 6.0'	4.0-6.0'	< 4.0'
Permeability <sup>1/</sup>	Percs. Slowly	>2.0"/hr	0.6-2.0"/hr	< 0.6"/hr
Slope	Slope	0-8%	8-15%	> 15%
Fraction >3" <sup>2/</sup>	Large Stones	< 25%	25-50%	> 50%

Footnotes pertain to these limitations only

1/ Slowest permeability between 24-60 inches

2/ Weighted average to 40 inches

# SOIL LIMITATION RATINGS FOR SEWAGE LAGOONS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Permeability <u>1/</u>	Seepage	<0.6"/hr	0.6-2.0"/hr	> 2.0"/hr
Bedrock <u>2/</u>	Depth To Rock	> 60"	40-60"	<40"
Cemented Pan <u>2/</u>	Cemented Pan	>60"	40-60"	<40"
Flooding	Floods	None or Protected	-	Rare, Common
Slope	Slope	0-2%	2-7%	> 7%
Unified	Excess Humus	<2% Organic matter	2-20% Organic matter	>20% Organic matter
High Water Table	Wetness	> 5.0'	3.5-5.0'	< 3.5'
Fraction >3" <u>3/</u>	Large Stones	<25%	25-50%	> 50%

Footnotes pertain to these limitations only

1/ Highest permeability between 12-60 inches

2/ If rippable rate one class better

3/ Weighted average to 20 inches

SOIL LIMITATION RATINGS FOR TRENCH-TYPE SANITARY LANDFILLS  
(a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None or Protected	Rare	Common
Bedrock	Depth To Rock	-	-	<72"
Cemented Pan <u>1/</u>	Cemented Pan	-	-	<72"
Permeability <u>2/3/</u>	Seepage	-	-	> 2.0"/hr
High Water Table Perched Water Table	Wetness	- ----- >4.0'	- ----- 2.0-4.0'	< 6.0' ----- < 2.0'
Slope	Slope	0-15%	15-25%	>25%
USDA Texture <u>4/</u>	Too Clayey	-	Clay Loam, Sandy Clay, Silty Clay Loam	Silty Clay, Clay
USDA Texture <u>4/</u>	Too Sandy	-	All Loamy Sands	All Sands
Unified <u>4/</u>	Excess Humus	-	-	Organic Soils, Peat
Fraction >3" <u>5/</u>	Large Stones	< 25%	25-50%	50%

Footnotes pertain to these limitations only.

1/ If rippable rate one class better

2/ Bottom layer

3/ Disregard permeability in all Aridisols except Salorthids and Aquic intergrades and all Torri great groups of Entisols except Aquic and Aridic intergrades of Mollisols

4/ Thickest horizon between 12-60 inches

5/ Weighted average to 40 inches

SOILS LIMITATION RATINGS FOR AREA-TYPE SANITARY LANDFILLS  
 ( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None or Protected	Rare	Common
Permeability <sup>1/</sup>	Seepage	-	-	>2.0"/hr
High Water Table Perched Water Table	Wetness	<div> <div>&gt; 5.0'</div> <div>&gt; 3.0'</div> </div>	<div> <div>3.5-5'</div> <div>1.5-3.0'</div> </div>	<div> <div>&lt;3.5'</div> <div>&lt;1.5'</div> </div>
Slope	Slope	0-8%	8-15%	> 15%

Footnotes pertain to these limitations only

- <sup>1/</sup> Disregard permeability in all Aridisols except Salorthids and Aquic intergrades and all Torri great groups of Entisols except Aquic and Aridic intergrades of Mollisols

SUITABILITY OF SOILS AS SOURCE OF COVER MATERIAL FOR  
LANDFILLS .

(a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		GOOD	FAIR	POOR
USDA Texture <u>1/</u>	Too Clayey	-	Clay Loam, Silty Clay Loam, Sandy Clay	Silty Clay, Clay
USDA Texture <u>1/</u>	Too Sandy	-	All Loamy Sands	All Sands
Unified <u>1/</u>	Hard To Pack	-	MH, CH	Organic Soils
Layer Thickness	Thin Layer	> 40"	20-40"	< 20"
Rock Fragment <u>2/</u> <3"	Small Stones	< 25%	25-50%	> 50%
Fraction >3" <u>2/</u>	Large Stones	< 25%	25-50%	> 50%
High Water Table	Wetness	-	-	1.0' or less
Slope	Slope	0-8%	8-15%	>15%
Bedrock	Thin Layer, Area Reclaim	>60"	40-60"	< 40"
Cemented Pan	Thin Layer, Area Reclaim	>60"	40-60"	< 40"
Unified <u>1/</u>	Excess Humus	-	-	Peat
Unified <u>1/</u>	Seepage	-	-	SP, SW, SP-SM, SW-SM, GP, GW, GP-GM, GW-GM

Footnotes pertain to these limitations only

1/ Thickest horizon between 12-60 inches

2/ Weighted average to 40 inches

# SOIL LIMITATIONS RATINGS FOR SHALLOW EXCAVATION

( a "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Bedrock <u>1/</u>	Depth To Rock	> 60"	40-60"	< 40"
Cemented Pan <u>1/</u>	Cemented Pan	> 60"	40-60"	< 40"
USDA Texture <u>2/</u>	Cutbank Cave	-	Silt	All Loamy Sands, All Sands, All Very Gravelly Soils
USDA Texture <u>2/</u>	Too Clayey	-	Clay Loam, Sandy Clay	Clay, Silty Clay
Unified	Excess Humus	-	-	Organic Soils, Peat
Fractions >3" <u>3/</u>	Large Stones	< 25%	25-50%	> 50%
High Water Table	Wetness	> 5.0'	2.5-5.0'	< 2.5'
Flooding	Floods	None or Protected	Rare	Common
Slope	Slope	0-8%	8-15%	> 15%

Footnotes pertain to these limitations only

1/ If rippable rate one class better

2/ 20-60" depth

3/ Weighted average to 40 inches

SOIL LIMITATION RATINGS FOR DWELLINGS WITHOUT BASEMENTS  
( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None	-	Rare, Common
High Water Table	Wetness	> 2.5'	1.5-2.5'	< 1.5
Shrink-Swell <u>1/</u>	Shrink-Swell	Low	Moderate	High
Unified Class <u>2/</u>	Low Strength	-	CL <u>3/</u> ML <u>4/</u>	Organic Soils, Peat, CH, MH
Slope	Slope	0-8%	8-15%	>15%
Bedrock <u>5/</u>	Depth To Bed-rock	>40"	20-40"	<20'
Cemented Pan <u>5/</u>	Cemented Pan	>40"	20-40"	<20"
Fractions >3" <u>6/</u>	Large Stones	<25%	25-50%	>50%

Footnotes pertain to these limitations only

1/ Thickest horizon between 10-40 inches

2/ 20-40" depth

3/ Rate slight if PI <15

4/ Rate slight if soil is Udic or Xeric suborders or great group

5/ If rippable rate one class better

6/ Weighted average to 40 inches

SOIL LIMITATION RATINGS FOR DWELLINGS WITH BASEMENTS  
 ( a dash "-" indicates property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None or Protected	-	Rare, Common
High Water Table	Wetness	>5.0'	2.5-5.0'	<2.5'
Bedrock <u>1/</u>	Depth To Bed-rock	> 60"	40-60"	< 40"
Cemented Pan <u>1/</u>	Cemented Pan	> 60"	40-60"	< 40"
Slope	Slope	0-8%	8-15%	15%
Shrink-Swell <u>2/</u>	Shrink-Swell	Low	Moderate	High
Unified Class <u>2/</u>	Low Strength	-	ML <u>4/</u> CL <u>5/</u>	CH, MH, Organic Soils, Peat
Fraction >3" <u>3/</u>	Large Stones	< 25%	25-50%	> 50%

Footnotes pertain to these limitations only

1/ If rippable rate one class better

2/ 20-60" depth

3/ Weighted average to 40 inches

4/ Rate slight if soil is in Udic or Xeric suborder or great group

5/ Rate slight if PI <15

SOIL LIMITATION RATINGS FOR SMALL COMMERCIAL BUILDINGS  
( a "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None or Protected	-	Rare, Common
High Water Table	Wetness	> 2.5'	1.5-2.5'	<1.5'
Shrink-Swell <u>1/</u>	Shrink-Swell	Low	Moderate	High
Slope	Slope	0-4%	4-8%	> 8%
Unified Class <u>2/</u>	Low Strength	-	ML <u>3/</u> CL <u>4/</u>	CH, MH, Organic Soils, Peat
Bedrock <u>5/</u>	Depth To Bedrock	>40"	20-40"	<20"
Cemented Pan <u>5/</u>	Cemented Pan	>40"	20-40"	< 20"
Fraction >3" <u>6/</u>	Large Stones	<25%	25-50%	> 50%

Footnotes pertain to these limitations only

1/ Thickest horizon between 10-40 inches

2/ 20-40 inch depth

3/ Rate slight if soil is Udic or Xeric suborder or great group

4/ Rate slight if PI is <15

5/ If rippable rate one class better

6/ Weighted average to 40 inches

SOIL LIMITATION RATINGS FOR LOCAL ROADS AND STREETS  
( a "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Bedrock <u>1/</u>	Depth To Bedrock	>40"	20-40"	< 20"
Cemented Pan <u>1/</u>	Cemented Pan	>40"	20-40"	< 20"
Group Index Number <u>2/</u>	Low Strength	0-4	5-8	> 8
Unified Class <u>2/</u>	Low Strenght	-	ML, CL-ML	CL <u>3/</u> CH-MH, CH, MH Organic Soils, Peat
High Water Table	Wetness	>2.5'	1.0-2.5'	<1.0'
Slope	Slope	0-8%	8-15%	15%
Flooding	Floods	None	Rare	Common
Potential Frost Action	Frost Action	Low	Moderate	High
Shrink-Swell <u>2/</u>	Shrink-Swell	Low	Moderate	High
Fraction >3"	Large Stones	<25%	25-50%	> 50%

Footnotes pertain to these limitations only

1/ If rippable rate one class better

2/ Thickest horizon between 10-40 inches

3/ Rate moderate if PI <15

# SUITABILITY RATINGS AS A SOURCE OF ROADFILL

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		GOOD	FAIR	POOR
Group Index Number <u>1/</u>	Low Strength	0-4	5-8	> 8
Unified Class <u>1/</u>	Low Strength	-	ML, CL-ML	CL <u>3/</u> CH, CH-MH, MH Organic Soils, Peat
Fraction >3" <u>2/</u>	Large Stones	<25%	25-50%	>50%
Layer Thickness	Thin Layer	>60"	36-60"	< 36"
High Water Table	Wetness	>3.0'	1.0-3.0'	<1.0'
Slope	Slope	0-15%	15-25%	>25%
Shrink-Swell <u>1/</u>	Shrink-Swell	Low	Moderate	High
Bedrock	Area Reclaim	>60"	40-60"	<40"

Footnotes pertain to these limitations only

1/ Thickest horizon between 10-40 inches

2/ Weighted average to 40 inches

3/ Rate moderate if PI <15

# SUITABILITY RATINGS OF SOIL AS SOURCE OF SAND

( a dash "-" indicates property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		GOOD	FAIR	POOR
Unified Class	Excess Fines	SW, SP	SW-SM, SP-SM	SM, SW-SC, <u>1/</u> SP-SC
Unified Class	Excess Humus	-	-	Peat <u>2/</u>
Layer Thickness	Thin Layer	>36"	-	<36"
Fraction >3" <u>3/</u>	Large Stones	<10%	10-50%	>50%

Footnotes pertain to these limitations only

1/ Rate all others unsuited

2/ Rate peat unsuited

3/ Weighted average to 40 inches

# SUITABILITY RATINGS OF SOIL AS SOURCE OF GRAVEL

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		GOOD	FAIR	POOR
Unified Class	Excess Fines	GW, GP	GW-GM, GP-GM	GM, GW-GC, <sup>1/</sup> GP-GC
Unified Class	Excess Humus	-	-	Peat <sup>2/</sup>
Layer Thickness	Thin Layer	>36"	-	< 36"
Fraction >3" <sup>3/</sup>	Large Stones	<20%	20-50%	>50%

Footnotes pertain to these limitations only

<sup>1/</sup> Rate all other unsuited

<sup>2/</sup> Rate Peat unsuited

<sup>3/</sup> Weighted average to 40 inches

# SUITABILITY RATINGS OF SOILS AS SOURCE OF TOPSOIL

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		GOOD	FAIR	POOR
USDA Texture <u>1/</u>	Too Sandy	-	All Loamy Sands	All Sands
USDA Texture <u>1/</u>	Too Clayey	-	Sandy Clay Loam, Clay Loam, Silty Clay Loam, Sandy Clay	Silty Clay, Clay
USDA Texture <u>1/</u>	Excess Humus	-	-	Organic Soils, Peat
USDA Texture <u>1/</u>	Inerts Material	-	-	Diatomaceous Earth
USDA Texture <u>1/</u>	Excess Lime	-	>15	Marl
Fraction >3" <u>1/</u>	Large Stones	<15%	15-30%	>30%
Rock Fragments <3" <u>1/</u>	Small Stones	<5%	5-25%	>25%
Salinity <u>1/</u>	Excess Salt	4 mmhos	4-8 mmhos	> 8 mmhos
Layer Thickness	Thin Layer	>16"	8-16"	<8"
High Water Table	Wetness	-	-	<1.0'
Soil Reaction <u>1/</u>	Excess Sodium	-	-	>8.4 pH <u>2/</u>
Soil Reaction	Too Acid	-	-	<3.5 pH
Slope	Slope	0-8%	8-15%	>15%
Bedrock, Cemented Pan	Area Reclaim	>40"	20-40"	<20"

Footnotes pertain to these limitations only

1/ 0-16" depth

2/ Soils >15 percent exchangeable sodium

# SOIL LIMITATION RATINGS FOR POND RESERVOIR AREAS

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Permeability <u>1/</u>	Seepage	<0.6"/hr	0.6-2.0"/hr	>2.0"/hr
Depth To Horizon With Permeability >2.0"/hr	Seepage	>60"	40-60"	<40"
Bedrock	Depth To Rock	>60"	20-60"	<20"
Cemented Pan	Cemented Pan	>50"	20-60"	<20"

Footnotes pertain to these limitations only

1/ 20-60" depth

# SOIL LIMITATION RATINGS FOR EMBANKMENTS, DIKES, AND LEVEES

( a dash "-" indicates property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Layer Thickness	Thin Layer	>60"	24-60"	<24"
Unified Class <u>1/</u>	Seepage	-	GM, SM <u>2/</u>	GW, GP, SW, SP, GW-GM, GP-GM, SW-SM, SP-SM
Unified Class <u>1/</u>	Hard To Pack	-	CH, OL	MH, OH
Unified Class <u>1/</u>	Piping	-	-	ML <u>3/</u> , SM, <u>4/</u> , SP <u>5/</u>
Unified Class <u>1/</u>	Excess Humus	-	-	Peat
Fraction >3" <u>1/</u>	Large Stones	<25%	25-50%	>50%
High Water Table	Wetness	>3.0'	1.0-3.0'	<1.0'
Soil Reaction	Piping	-	-	>8.4 pH <u>6/</u>
Salinity	Excess Salt	0-8 mmhos	8-16 mmhos	>16 mmhos

Footnotes pertain to these limitations only

1/ Thickest horizon between 10-60 inches

2/ Include only those SM's with Loamy Coarse Sand, Loamy Sand, Sandy Loam, Coarse Sand Loam, or Fine Sandy Loam textures

3/ Rate ML slight if PI <5

4/ Include only those SM's with Loamy Fine Sand, Loamy Very Fine Sand, or Very Fine Sandy Loam textures.

5/ Include only those SP's with Fine Sand, or Very Fine Sand textures

6/ Soils >15 percent exchangeable sodium

# SOIL LIMITATION RATINGS FOR EXCAVATED PONDS AQIFIER FED

( a dash "-" indicates property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
High Water Table	No Water	-	-	> 5.0'
	Deep To Water	< 2.0'	2.0-5.0'	-
Permeability <u>1/</u>	Slow Refill	>2.0"/hr	0.6-2.0"/hr	<0.6"/hr
Salinity	Salty Water	< 8 mmhos	8-16 mmhos	>16 mmhos
Fraction >3" <u>2/</u>	Large Stones	< 25%	25-50%	> 50%

Footnotes pertain to these limitations only

1/ Below 10 inches

2/ Weighted average to 40 inches

# SOIL LIMITATION RATINGS FOR DRAINAGE

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS	
		FAVORABLE	LIMITING FACTORS
High Water Table <u>1/</u>	Not Needed >3.0'	-	-
	Favorable	< 3.0'	-
Permeability <u>2/</u>	Percs. Slowly	-	< 0.2"/hr
Bedrock	Depth To Rock	-	<40"
Cemented Pan	Cemented Pan	-	<40"
Flooding	Floods	None, Rare, Protected	Common
Potential Frost Action <u>4/</u>	Frost Action	-	High
Slope	Slope	-	>6%
Salinity <u>4/</u>	Excess Salt	-	>4 mmhos
Soil Reaction	Excess Sodium	-	>8.4 <u>3/</u>

Footnotes pertain to these limitations only

1/ If >3 feet rate Not Needed. If <3.0' and no other limitations rate Favorable

2/ 0-40" depth

3/ Soils >15 percent exchangeable sodium

4/ Not rating factors in Utah

# SOIL LIMITATION RATINGS FOR TERRACES AND DIVERSIONS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS	
		FAVORABLE	LIMITING FACTORS
Fraction >3"	Large Stones	-	> 25%
Slope <u>1/</u>	Not Needed	-	-
	Favorable	2-12%	-
	Slope	-	>12%
Bedrock	Depth To Rock	-	<24"
Cemented Pan	Cemented Pan	-	<24"
Erosion Factor "K" value	Erodes Easily	-	>.40
High Water Table	Wetness	-	<3.0'
USDA Texture	Too Sandy	-	Loamy Sand, Loamy Coarse Sand and all Sands
Wind Erodibility Group	Soil Blowing	-	1, 2, 3, <u>2/</u>
Permeability	Percs. Slowly	-	<0.2"/hr

Footnotes pertain to these limitations only

1/ If <2% rate Not Needed . If 2-12% and no other limitations  
rate Favorable

2/ See Utah Guide for "Wind Erosion Control on Cropland", June 1967

# SOIL LIMITATION RATINGS FOR GRASSED WATERWAYS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS	
		FAVORABLE	LIMITING FACTORS
Fraction >3"	Large Stones	<25%	>25%
High Water Table	Wetness	>1.5'	<1.5'
Slope	Slope	<8%	>8%
Salinity	Excess Salt	<8 mmhos	>8 mmhos
Soil Reaction	Excess Sodium	<8.4	>8.4 pH <sup>2/</sup>
Erosion Factor "K" value	Erodes Easily	<.40	> .40
Available Water Capacity	Droughty	>0.10"/in	<0.10"/in
Bedrock	Rooting Depth	>20"	< 20"
Bedrock	Depth To Rock	>40"	<40"
Cemented Pan	Rooting Depth	>20"	< 20"
Cemented Pan	Cemented Pan	>40"	< 40"
Permeability <sup>1/</sup>	Percs. Slowly	>0.2"/hr	<0.2"/hr

Footnotes pertain to these limitations only

1/ 0-40 " depth

2/ Soils >15 percent exchangeable sodium

# SOIL LIMITATION RATINGS FOR CAMP AREAS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Flooding	Floods	None or Protected	-	Rare, Common
Slope	Slope	0-8%	8-15%	>15%
Fraction >3" <u>1/</u>	Large Stones	<25%	25-50%	>50%
Rock Fragments <u>1/</u> <3"	Small Stones	<30%	30-65%	>65%
High Water Table	Wetness	>2.5'	1.5-2.5'	<1.5'
Permeability <u>2/3/</u>	Percs. Slowly	>0.6"/hr	0.06-0.6"/hr	<0.06"/hr
USDA Texture <u>1/3/</u>	Too Clayey	-	Sandy Clay Loam, Clay Loam, Silty Clay Loam	Sandy Clay, Silty Clay, Clay
Unified <u>1/</u>	Excess Humus	-	-	Organic Soils, Peat
USDA Texture <u>1/</u>	Too Sandy	-	All Loamy Sands, Very Fine Sands	Coarse Sand, Sand, Fine Sand
Bedrock	Depth To Rock	-	-	<1.0'
USDA Texture <u>1/</u>	Dusty	-	Silt Loam, Silt, Very Fine Sandy Loam	-

Footnotes pertain to these limitations only

1/ Applies to surface horizon

2/ 0-4 inches

3/ Soils in Ustic, Torri, Aridic, or Xeric suborders, great groups, or subgroups rate one class higher

# SOIL LIMITATION RATINGS FOR PICNIC AREAS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Slope	Slope	0-8%	8-15%	> 15%
Flooding	Floods	Protected, None, Rare, Occasional	Frequent	-
High Water Table	Wetness	>2.5'	1.0-2.5'	< 1.0'
Fraction >3" <u>1/</u>	Large Stones	<25%	25-50%	> 50%
USDA Texture <u>1/2/</u>	Too Clayey	-	Sandy Clay Loam, Clay Loam, Silty Clay Loam	Sandy Clay, Silty Clay, Clay
USDA Texture <u>1/</u>	Too Sandy	-	All Loamy Sands, Very Fine Sand	Coarse Sand, Sand, Fine Sand
USDA Texture <u>1/</u>	Excess Humus	-	-	Organic Soils, Peat
Rock Fragments <u>1/</u> <3"	Small Stones	<30%	30-65%	>65%
USDA Texture <u>1/</u>	Dusty	-	Silt Loam, Silt, Very Fine Sandy Loam	-

Footnotes pertain to these limitations only

1/ Applies to surface horizon

2/ Soils in Ustic, Torri, Aridic, or Xeric suborders, great groups,  
or subgroups rate one class higher

# SOIL LIMITATION RATINGS FOR PLAYGROUNDS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Fraction >3" <u>1/</u>	Large Stones	<10%	10-30%	> 30%
Slope	Slope	0-2%	2-6%	>6%
Rock Fragments <u>1/</u> <3"	Small Stones	<10%	10-30%	>30%
USDA Texture <u>1/</u>	Too Clayey	-	Sandy Clay Loam, Clay Loam, Silty Clay Loam	Sandy Clay, Silty Clay, Clay
USDA Texture <u>1/</u>	Too Sandy	-	All Loamy Sands, Very Fine Sand	Coarse Sand, Sand, Fine Sand
USDA Texture <u>1/</u>	Excess Humus	-	-	Organic Soils, Peat
High Water Table	Wetness	>2.5'	1.5-2.5'	<1.5'
Flooding	Floods	Protected, None, Rare	Occasional	Frequent
Bedrock	Depth To Rock	>40"	20-40" <u>2/</u>	<20"
Cemented Pan	Cemented Pan	>40"	20-40" <u>2/</u>	<20"
Permeability <u>3/4/</u>	Percs. Slowly	>0.6"/hr	0.06-0.6"/hr	<0.06"/hr
USDA Texture <u>1/</u>	Dusty	-	Silt Loam, Silt, Very Fine Sandy Loam	-

Footnotes pertain to these limitations only

1/ Applies to surface horizon

2/ Rate slight for slopes 0-2%

3/ 0-40" depth

4/ Soils in Ustic, Torric, Aridic, or Xeric suborders, great groups, or sub-groups rate one class higher

# SOIL LIMITATION RATINGS FOR PATHS AND TRAILS

( a dash "-" indicates the property is not a rating factor)

PROPERTY	RESTRICTION	LIMITS		
		SLIGHT	MODERATE	SEVERE
Fraction >3" <u>1/</u>	Large Stones	< 25%	25-50%	>50%
High Water Table	Wetness	>1.5'	0.5-1.5'	< 0.5'
USDA Texture <u>1/</u> <u>2/</u>	Too Clayey	-	Sandy Clay Loam, Clay Loam, Silty Clay Loam	Sandy Clay, Silty Clay, Clay
USDA Texture <u>1/</u>	Too Sandy	-	All Loamy Sands, Very Fine Sand	Coarse Sand, Sand, Fine Sand
USDA Texture <u>1/</u>	Excess Humus	-	-	Organic Soils, Peat
Slope	Slope	0-15%	15-25%	>25%
Rock Fragments <u>1/</u> <3"	Small Stones	<30%	30-65%	>65%
Flooding	Floods	Protected, None, Rare, Occasional	Frequent	-
USDA Texture <u>1/</u>	Dusty	-	Silt Loam, Silt, Very Fine Sandy Loam	-

Footnotes pertain to these limitations only

1/ Applies to surface horizon

2/ Soils in Ustic, Torri, Aridic, or Xeric suborders, great groups, or sub-groups rate one class higher

## GLOSSARY

**Aeration, soil.** The exchange of air in soil with air from the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvial fan.** Deposit of alluvium where a stream leaves a canyon or water-course and enters a plain or valley.

**Alluvium.** Material, such as rocks, sand, silt, or clay, deposited on land by streams.

**Area reclaim.** An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Aspect.** Facing a particular direction. Slopes with a south aspect faces south, etc.

**Association, soil.** A group of soils geographically associated in a characteristic repeating pattern defined and delineated as a single mapping unit.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inches of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as--

	Inches
Low-----	2 to 3.75
Moderately low-----	3.75 to 5.0
Moderate-----	5.0 to 7.5
Moderately high-----	7.5 to 10.0
High-----	More than 10.0

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bench terrace.** A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flooding plain of a stream, subject to frequent flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Slightly calcareous - 1 to 3 percent  $\text{CaCO}_3$  equivalent

Moderately calcareous - 3 to 15 percent  $\text{CaCO}_3$  equivalent

Strongly calcareous -15 to 40 percent  $\text{CaCO}_3$  equivalent

Very Strongly calcareous -more than 40 percent  $\text{CaCO}_3$  equivalent

Caliche. a more or less cemented deposit of calcium carbonate in soils of warm-temperature, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Carbonates. Calcium carbonates ( $\text{CaCO}_3$ ) or lime equivalent.

Channery soil. A soil, that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard, when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Cobbly soil. A soil that is 20 to 50 percent rock fragments (by volume) dominantly cobblestone size. A soil over 50 percent is very cobbly.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are--

Loose--Noncoherent when dry or moist; does not hold together in a mass.

Friable--When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm--When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic--When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky--When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard--When dry, moderately resistant to pressure; can be broken with difficulty between thumb and fore finger.

Soft--When dry, breaks into powder or individual grains under very slight pressure.

Cemented--Hard; little affected by moistening.

Control section. The part of the soil on which classification is based.

The thickness varies among different kinds of soil, but for many it is 10 or 40 inches.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Delta. An alluvial deposit, commonly triangular in shape, formed largely beneath water and deposited at the mouth of a river or stream.

Depth to rock. Bedrock within a depth that adversely affects the specified use.

Depth, soil.	Very deep-----more than 60 inches
	Deep-----40 to 60 inches
	Moderately deep -----20 to 40 inches
	Shallow -----10 to 20 inches
	Very shallow-----less than 10 inches

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized;

Excessively drained. -- Water is removed from the soil very rapidly.  
Excessively drained soils are related to wetness.

Somewhat excessively drained.--Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.--Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing season. They are mainly free of mottling.

Moderate well drained.--Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected.

Somewhat poorly drained.--Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage and run-in from adjacent areas, or a combination of these.

Poorly drained.-- Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, run-in from adjacent areas, or a combination of these.

Very poorly drained.--Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded..

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Erodibility, soil. The difference in rate of soil erosion between soils due to the inherent soil properties.

Erosion hazards. Susceptibility of a soil to erosion.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of the soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called normal field capacity, normal moisture capacity, or capillary capacity.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding. The temporary covering of soil with water from over flowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. None means that flooding is not probable; rare that is unlikely but possible under unusual weather conditions; occasional that it occurs on average of once or less in 2 years; and frequent that it occurs on an average of more than once in 2 years. Duration is expressed as very brief if less than 2 days, brief if 2 to 7 days, and long if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.--An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.--The mineral horizon, formed or forming at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon. -- A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon. --The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon. -- The mineral horizon or layer, excluding indurated bedrock that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

Cr horizon.-- A layer of soft geologic material commonly sandstone, siltstone, or shale. These materials have rock structure, but are soft enough for roots to penetrate and they hold a little available water for plants.

R layer--Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hummocky. Refers to a landscape of hillocks, separated by low sags,

processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Typically, the microrelief of Vertisols--clayey soils having a high coefficient of expansion and contraction with changes in moisture content. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with slope.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by melt water as it flows from glacial ice.

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Gravel. Rounded or angular fragments of rock up to 3 inches. (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravel soil material. Material from 20 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened up to 3 inches (7.5 centimeters) in diameter. If over 50 percent, it is very gravelly.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gypsum. Hydrous calcium sulphate.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils. See organic matter.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and have a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils have a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The rate in inches per hour at which water enters the surface soil. In this soil survey four general groups are used:

Slow-----	less than 0.5 inches per hour
Moderate-----	0.5 to 2.0 inches per hour
Rapid-----	2.0 to 3.5 inches per hour
Very rapid-----	more than 3.5 inches per hour

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants are those that follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are--

Border.--Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.--Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.--Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.--Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.--Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.--Water is spread over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.--Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.--Water, released at high points, is allowed to flow into an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material percolating water.

Lime, soil. Calcium carbonate ( $\text{CaCO}_3$ ).

Limitations, soil. Factors which restricts use or degree of use of a soil or soil material.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance-- few, common, and many; size--fine, medium, and coarse; and contrast--faint, distinct, and prominent. The size measurements are of the diameter along the greatest dimension. Fine indicates less than 5 millimeters (about 0.2 inches); medium, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and coarse, more than 15 millimeter (about 0.6 inches).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Munsell notation. A designation of color by degrees of the three single variables--hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nodules. See concretions.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Organic matter. (See Humus).

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by water that originated mainly from the melting of glacial ice. Glacial outwash is commonly in valleys on landforms known as valley trains, outwash terraces, eskers, kame terraces, kames, outwash fans, or deltas.

Outwash plain. A land form of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, hardpan, fragipan, claypan, plowpan, and traffic pan.

Parent material. The greater variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil". A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the

soil. Terms describing permeability are very slow (less than 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inches), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), and very rapid (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its use and management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affect use and management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Polypedon. A volume of soil having properties within the limits of a soil series, the lowest and most homogeneous category of soil taxonomy. A "soil individual".

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Potential vegetation (climax vegetation). The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Productivity (soil). The capability of soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile soil. A vertical section of the soil extending through all its horizons and into the parent materials.

Rangeland. Land that, for the most part, produces native plants suitable for grazing by live stock; includes land supporting some forest trees.

Range condition. The health or productivity of forage plants on a given range, in terms of the potential productivity under normal climate and the best practical management. Condition classes generally recognized are-- excellent, good, fair, and poor. The classification is based on the percentage of original, or assumed climax vegetation on a site, as compared to what has been observed to grow on it when well managed.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind and amount of native vegetation.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as--

	pH
Extremely acid-----	below 4.5
Very strongly acid-----	4.5 to 5.0
Strongly acid-----	5.1 to 5.5
Medium acid-----	5.6 to 6.0
Slightly acid-----	6.1 to 6.5
Neutral-----	6.6 to 7.3
Mildly alkaline-----	7.4 to 7.8
Moderately alkaline-----	7.9 to 8.4
Strongly alkaline-----	8.5 to 9.0
Very strongly alkaline-----	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Soil scientists regard as soil only the part of the regolith that is modified by organisms and other soil-building forces. Most engineers describe the whole regolith, even to a great depth, as "soil".

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Depth in inches to which roots penetrate.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Ponded--None of the water added to the soil as precipitation or by flow from surrounding higher land escapes as runoff.

Very slow--Surface water flows away so very slowly that free water lies on the surface for long periods or enters immediately into the soil.

Slow--Surface water flows away so slowly that free water covers the soil for significant periods or enters the soil rapidly and a large part of the water passes through the profile or evaporates into the air.

Medium--Surface water flows away at such a rate that a moderate proportion of the water enters the soil profile and free water lies on the surface for only short periods.

Rapid--A large proportion of the precipitation moves rapidly over the surface of the soil and a small part moves through the soil profile. Surface water runs off nearly as fast as it is added.

Very rapid--a very large part of the water moves rapidly over the surface of the soil and a very small part goes through the profile.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (geology). Soft, earthy, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil survey, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. Locally, a small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: very coarse sand (2.0 millimeters to 1.0 millimeter); coarse sand (1.0 to 0.5 millimeter); medium sand (0.5 to 0.25 millimeter); fine sand (0.25 to 0.10 millimeter); very fine sand (0.10 to 0.05 millimeter); silt (0.005 to 0.002 millimeter); and clay (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragment 10 to 24 inches (25 to 60 centimeters) in diameter.

Stoniness. Fragments of rock particles over 10 inches in diameter expressed as volume percentage of the surface. Class 0 - no stone, class 1 - from none to 0.1 percent, class 2 - 0.1 to 3 percent, class 3 - 3 to 15 percent, class 4 - 15 to 90 percent and class 5 - over 90 percent

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are--platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Subsurface layer. Technically, the a<sub>2</sub> horizon. Generally refers to a leached horizon lighter in color and lower in content of the organic matter than the overlaying surface layer.

Talus. Accumulation of rock fragments on or at the base of slopes deep enough that there is no vegetation. Rocks move down slope by gravity.

Terraces. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state

and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Top soil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Trace elements. The chemical elements in soils, in only extremely small amounts, essential to plant growth. Examples are zinc, cobalt, manganese, copper, and iron.

Tuff. A compacted deposit 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams emerging from hills or mountains and spreading sediments onto the lowland as a series of adjacent alluvial fans.

Variation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water-supplying capacity. The capacity of a soil to supply water that is stored during periods of plant dormancy plus the precipitation during the growing season until moisture is depleted.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

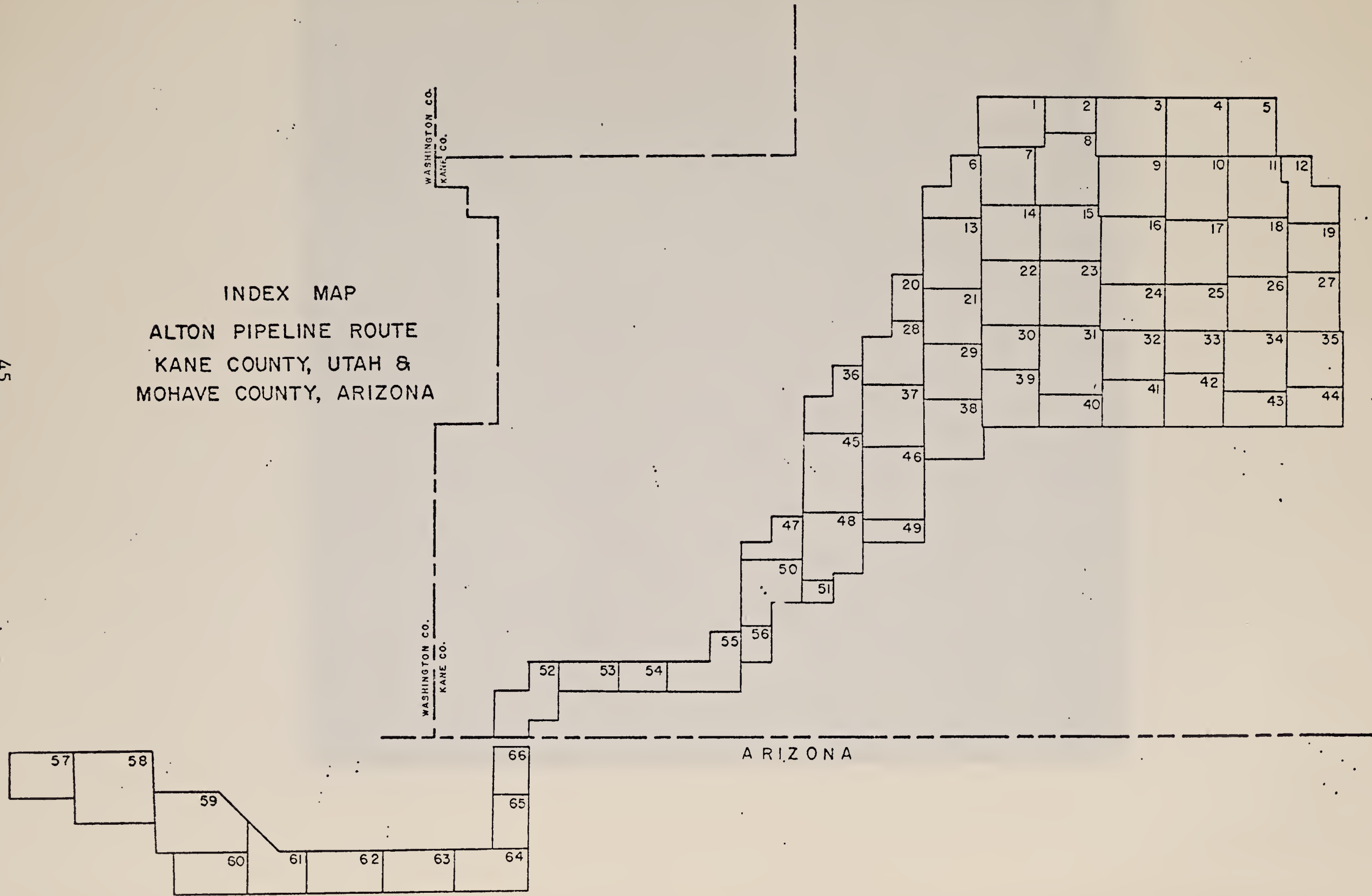
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

INDEX MAP  
ALTON PIPELINE ROUTE  
KANE COUNTY, UTAH &  
MOHAVE COUNTY, ARIZONA





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KANE COUNTY S.S. STAFF

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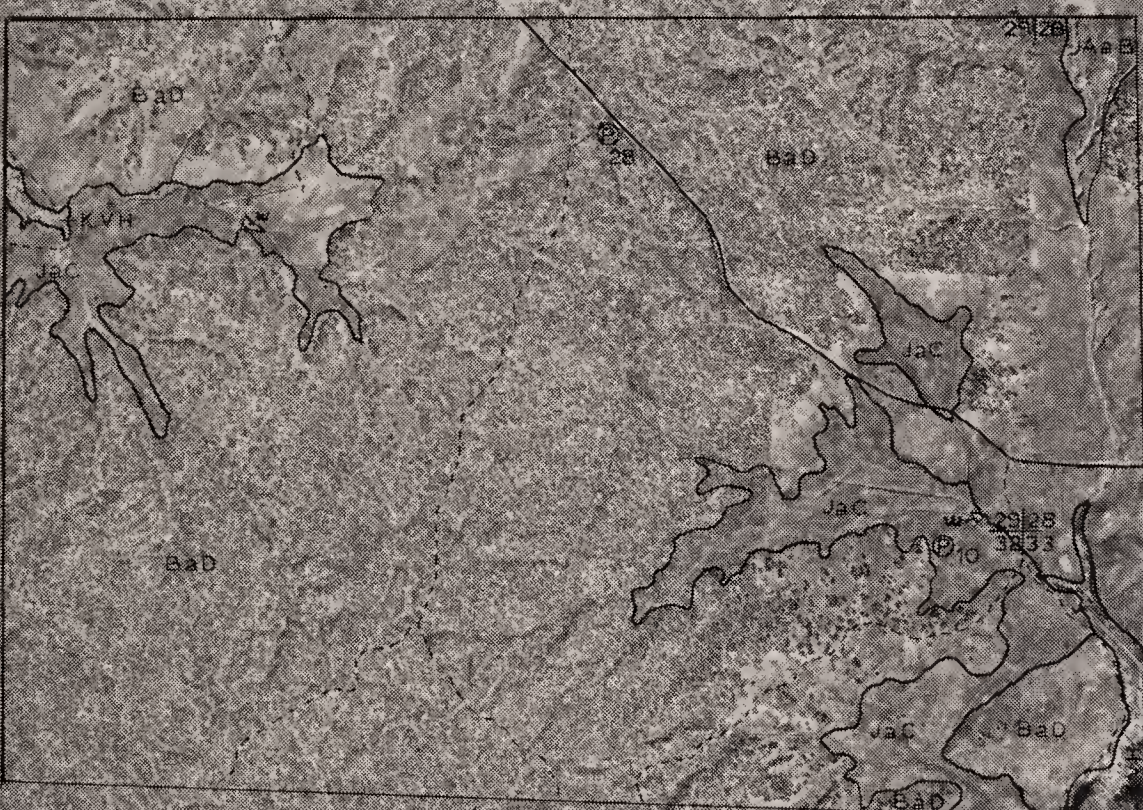
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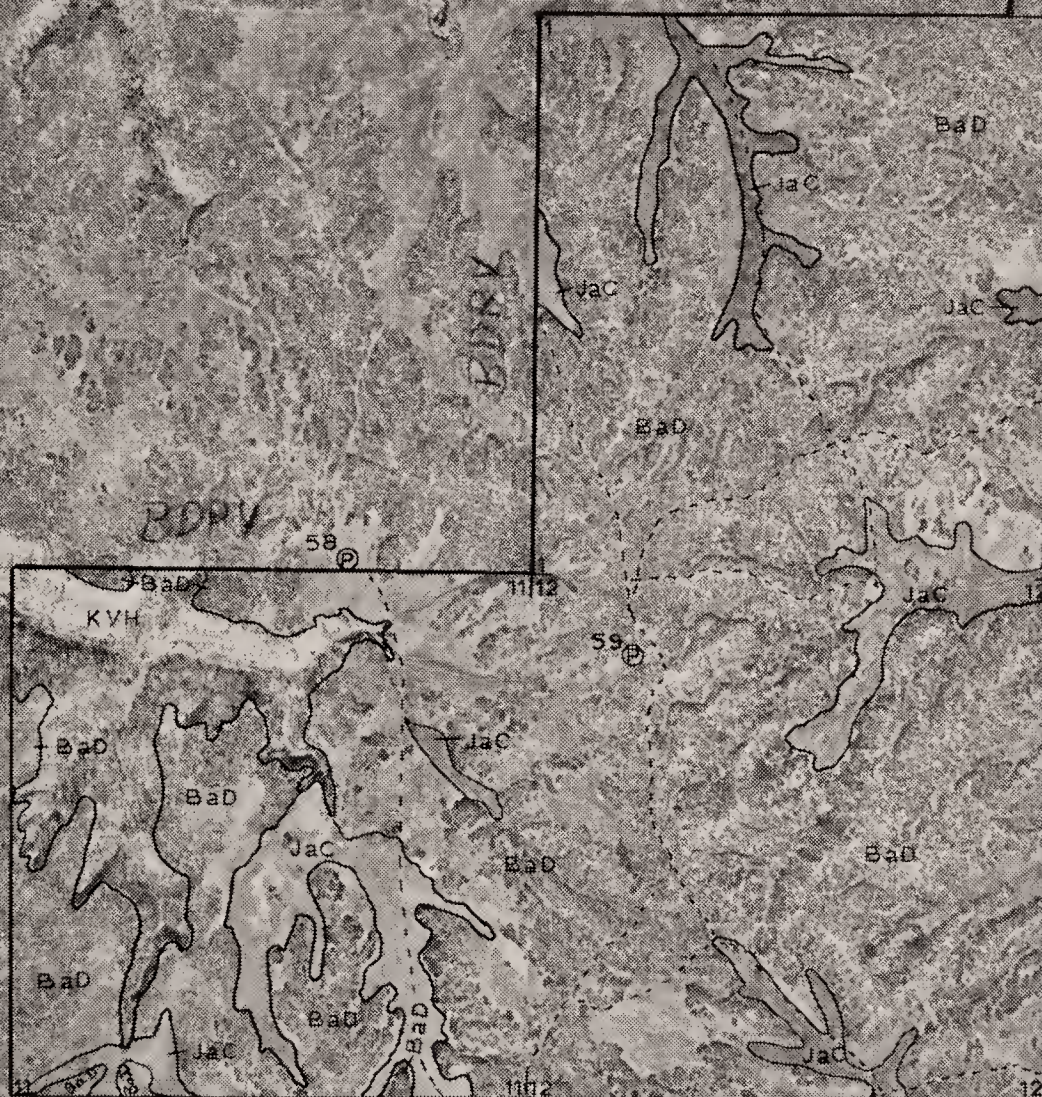
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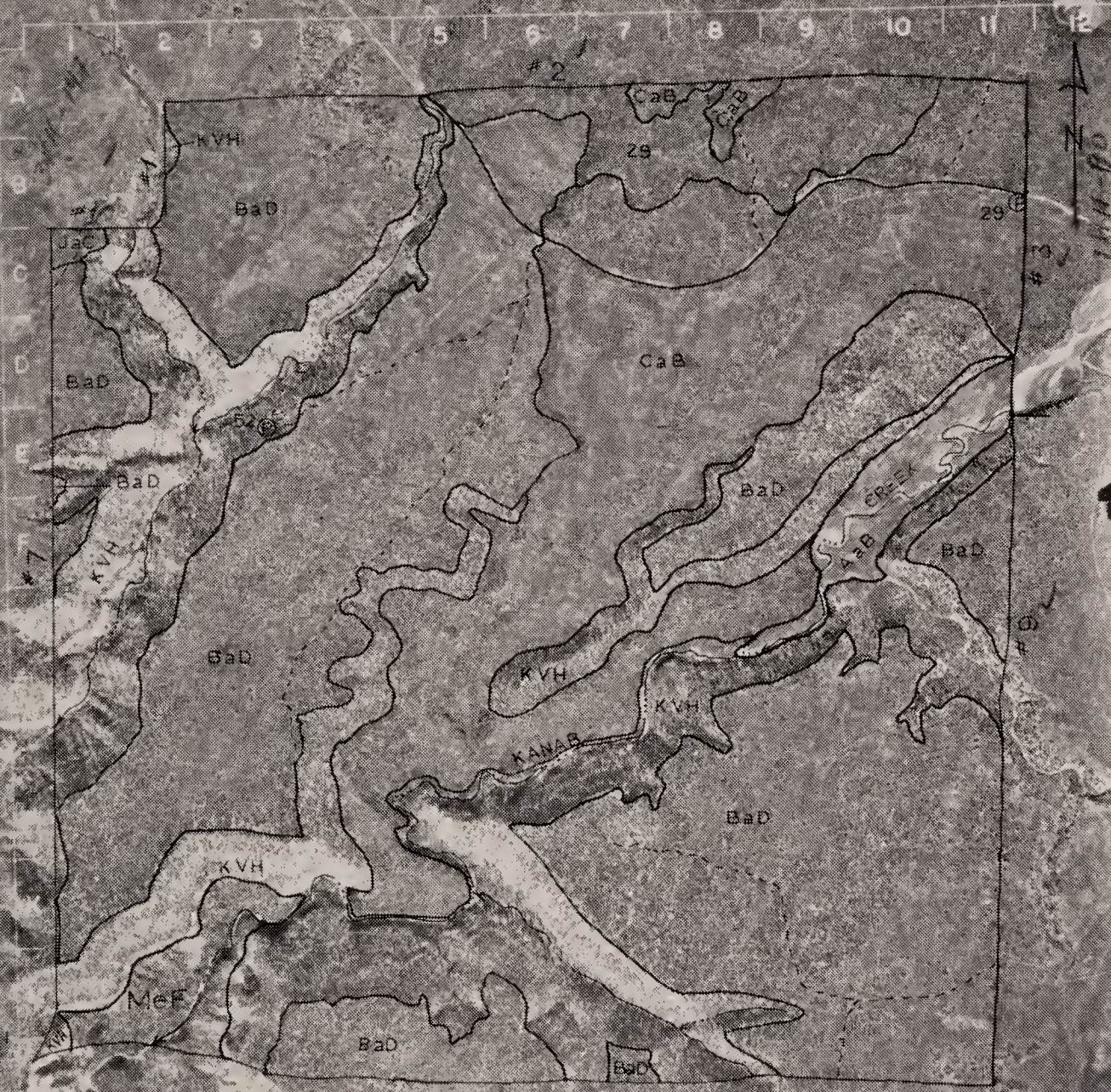
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This map shows the Johnson Wash area, with various land parcels labeled with codes. The parcels are labeled as follows:

- CaB
- AaB
- EaG
- AaB
- KvH
- BaD
- BkF
- #19

The map also includes a north arrow and a scale bar.

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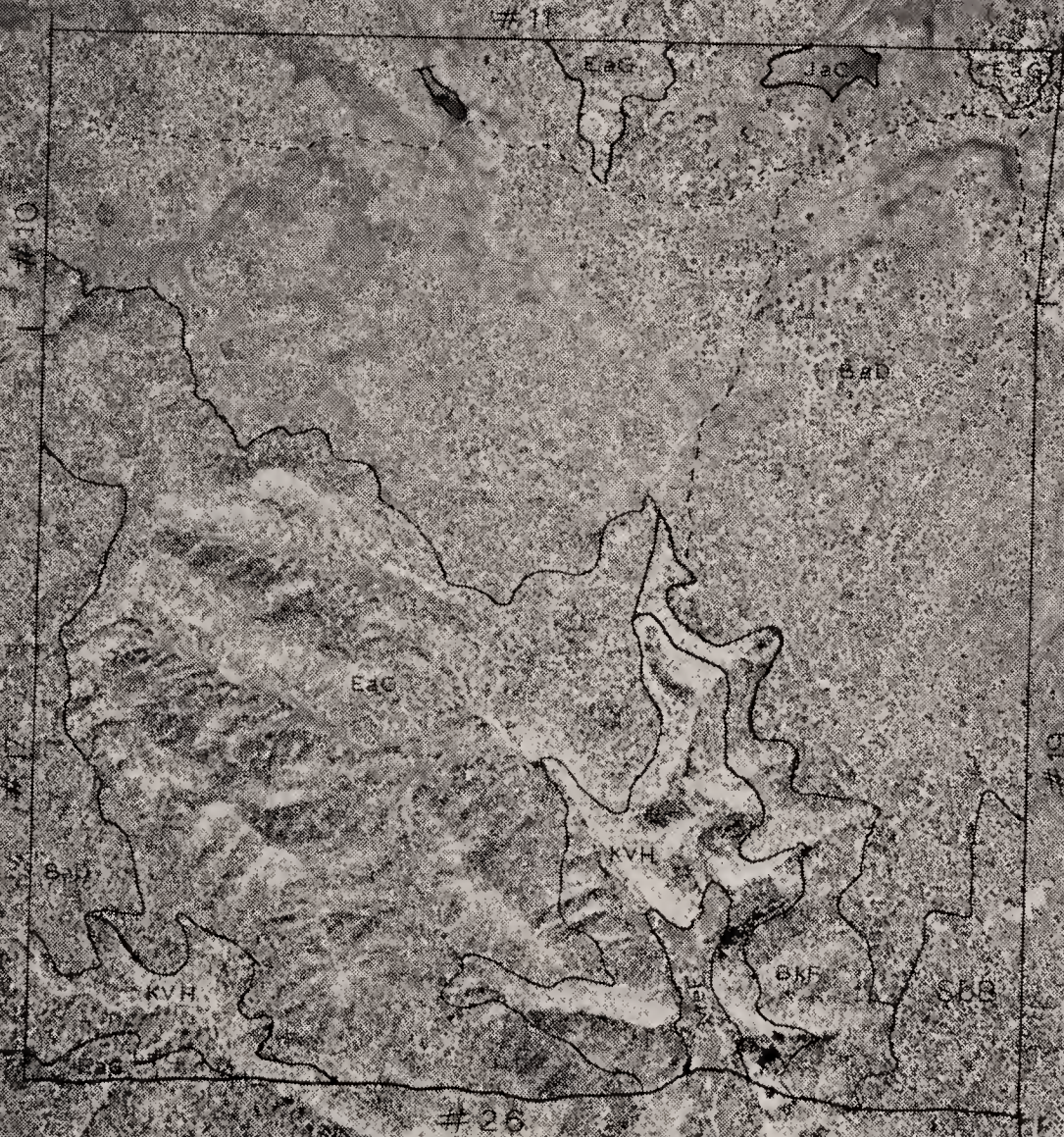
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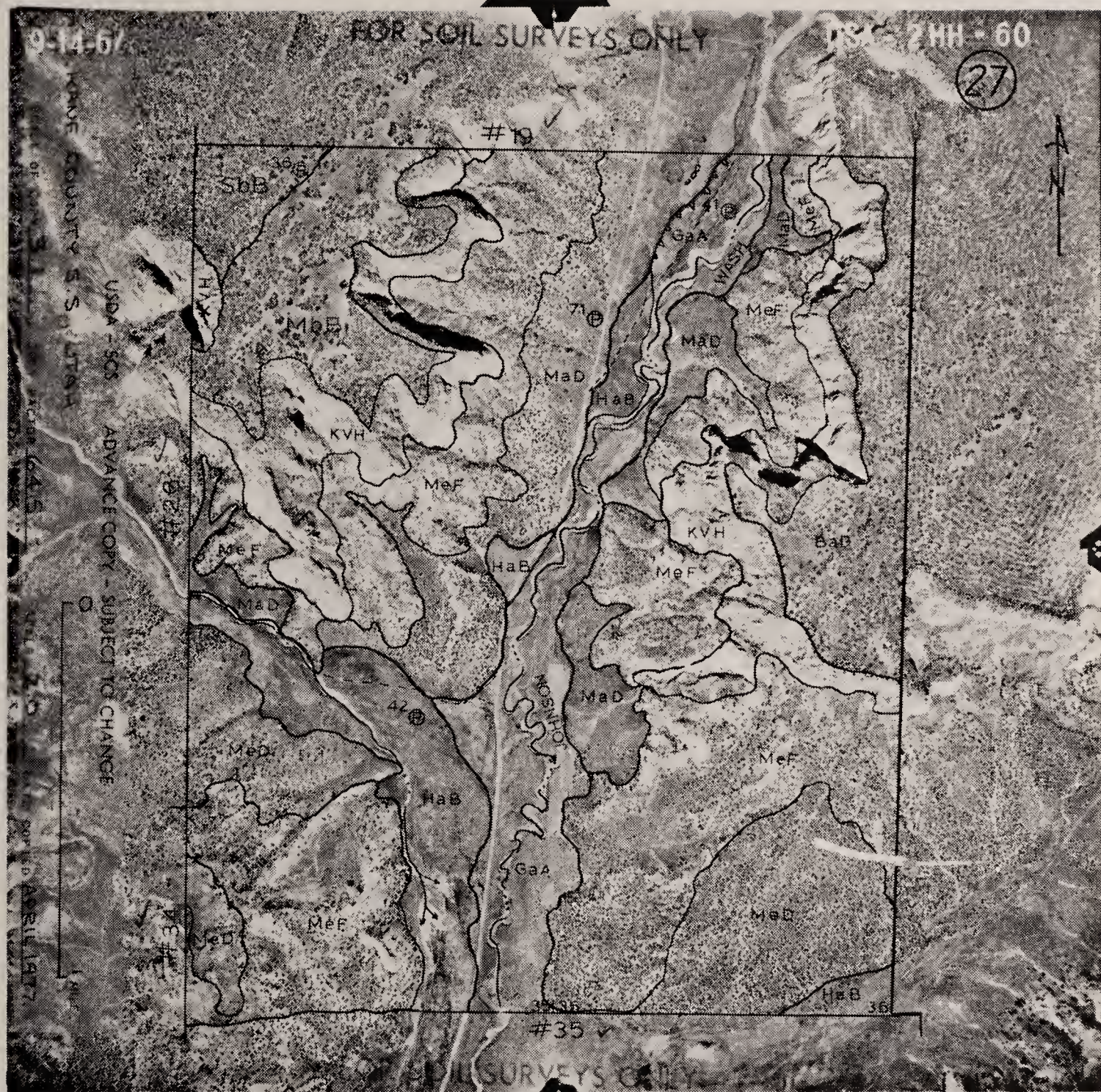


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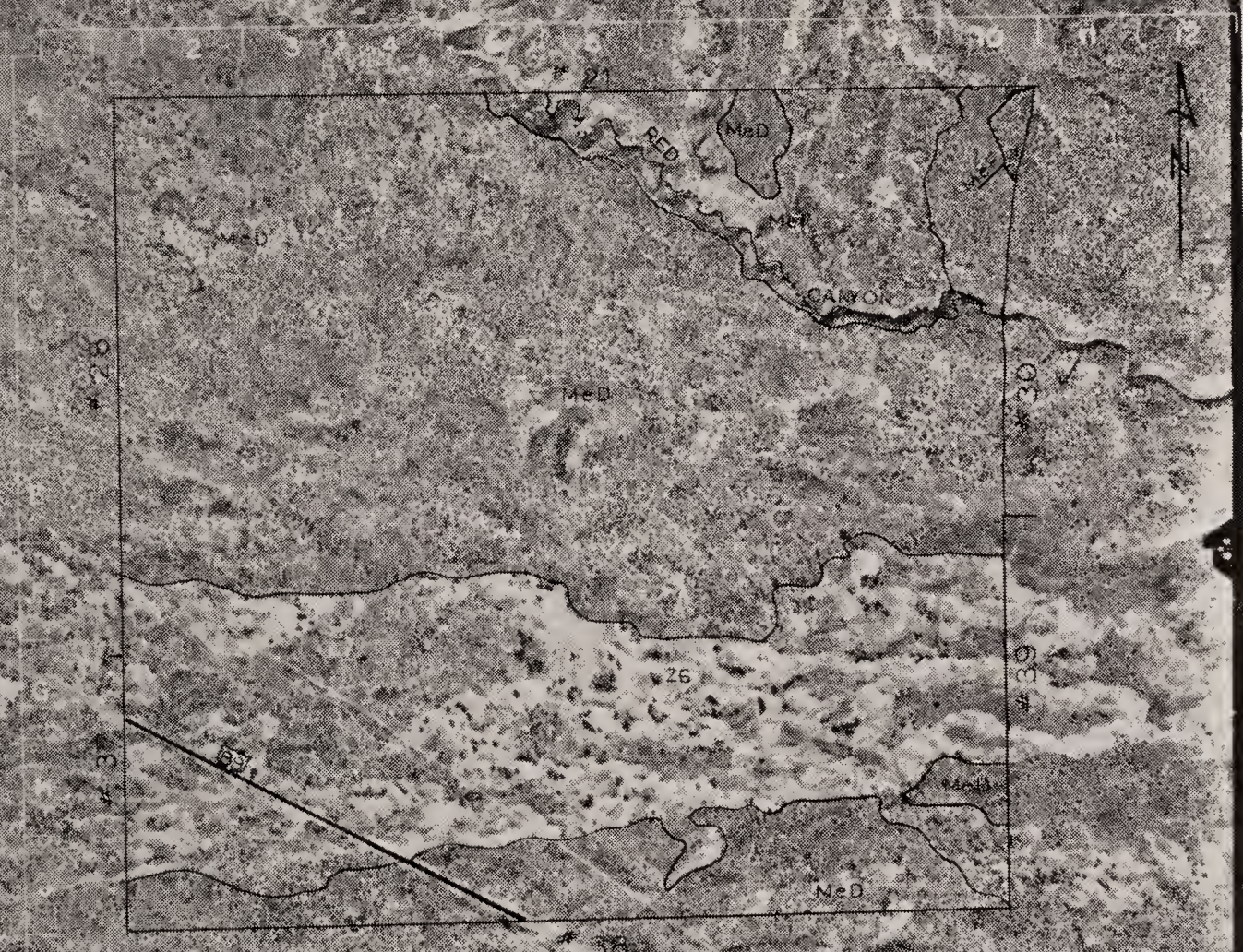
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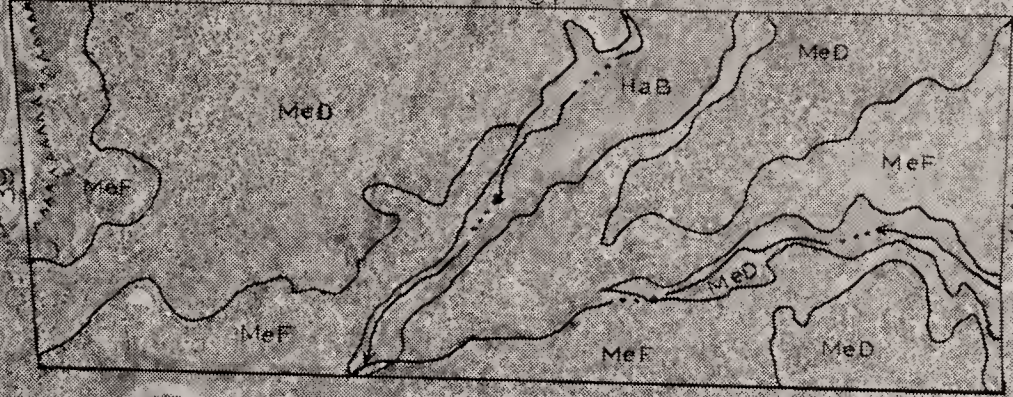
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KANE COUNTY S.S., UTAH

SCALE OF COPY 3.1 - 100% FACTOR 64.5

DATE COPIED APRIL 1977

SCALE 2.0



BDRY

FOR SOIL SURVEYS ONLY

VLM



6-27-60

FOR SOIL SURVEYS ONLY, AA-63

DSA-3 AA-65

41

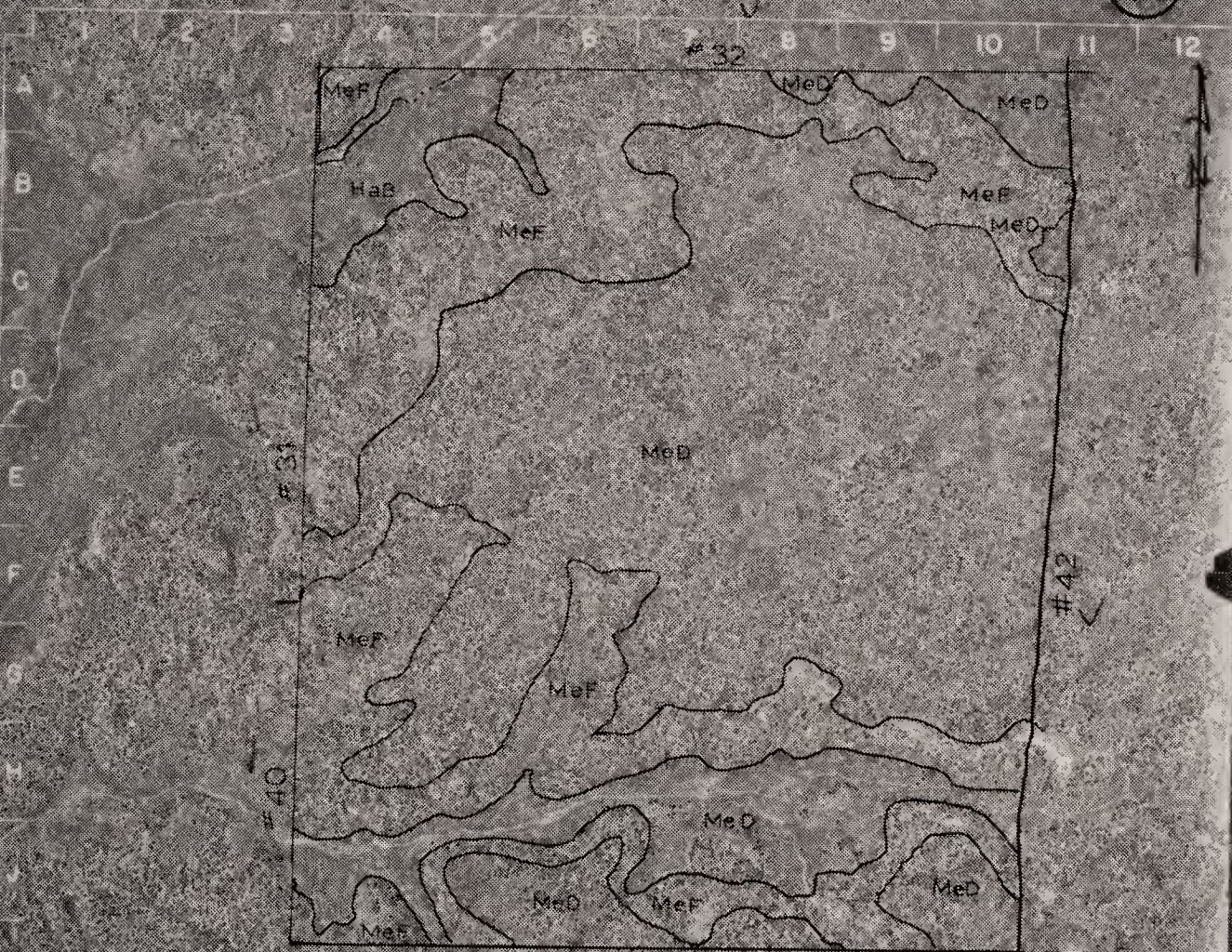
USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE

KANE COUNTY 3.5, UTAH

SCALE OF COPY 3.1 COPY FACTOR 64.5 DATE COPIED APRIL 1977

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1 MILE



BDRY

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DSA-3 AA-100

42

KANE COUNTY S.S., UTAH

USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE

SCALE OF COPY 3.1

COPY FACTOR 64.5

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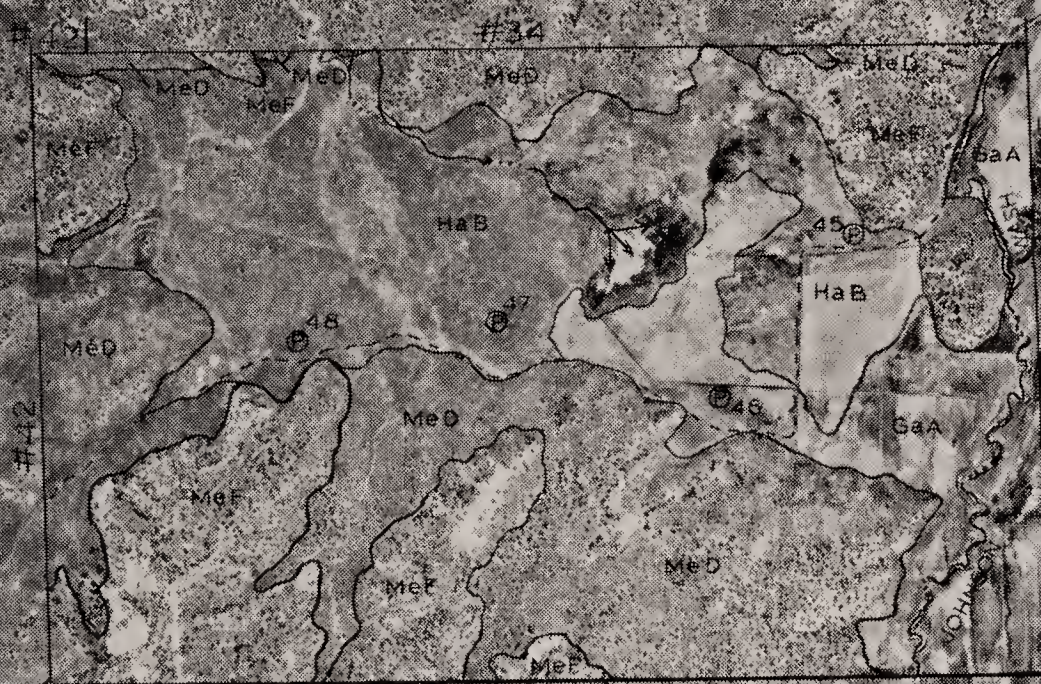
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9-14-67

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DSA - IHH - 252



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KANE COUNTY S.S., UTAH

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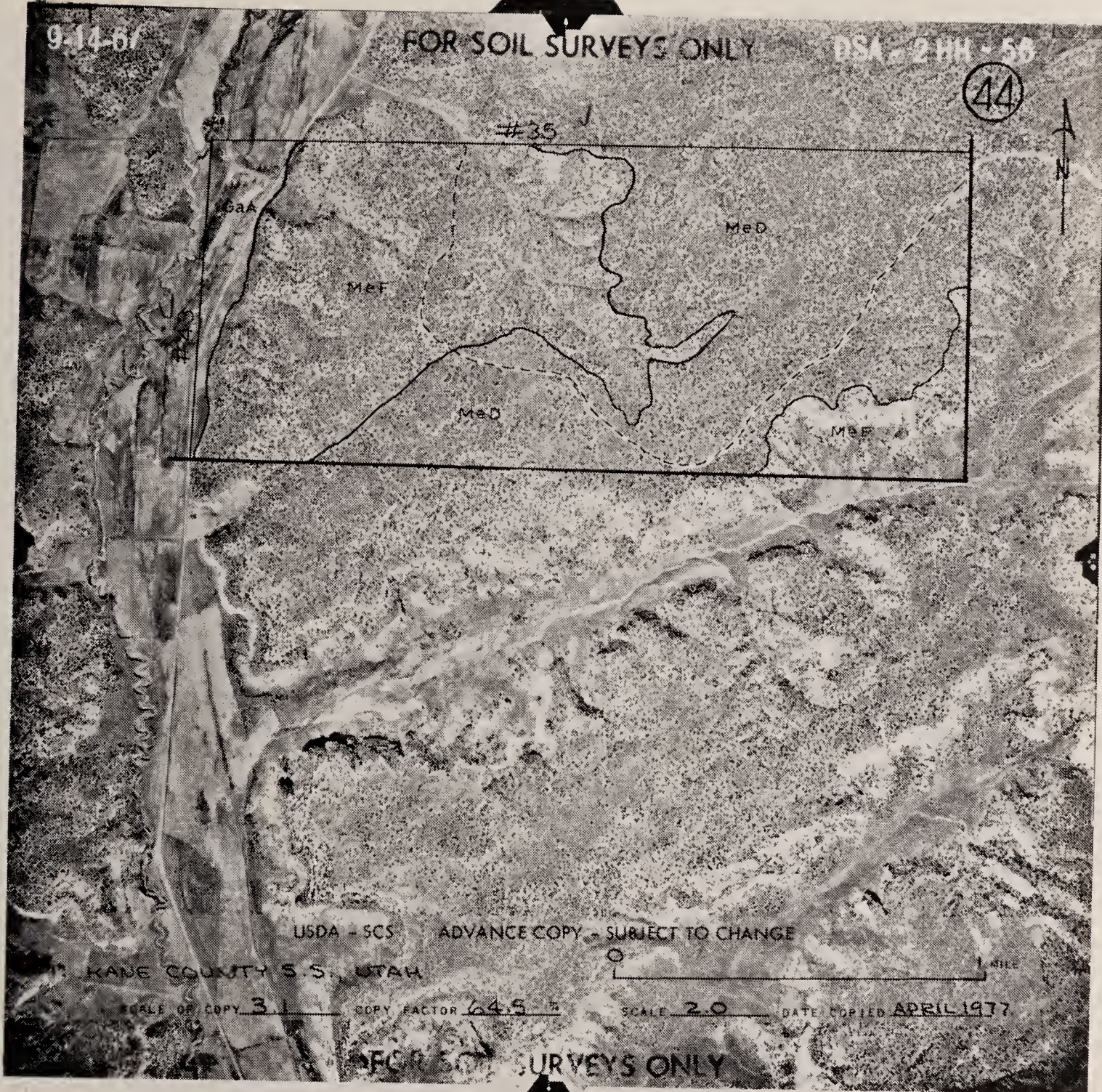


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DSA-2HH-58

44



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KANE COUNTY S.S. UTAH

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7-12-60

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DSA - 9AA - 50

45

RAKE COUNTY S.S., OTAH

USDA - SCS

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6-28-60

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(46)

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KANE COUNTY S.S., UTAH

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FOR SOIL SURVEYS ONLY - 53



6-25-60

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47

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KANE COUNTY S.S., UTAH

SCALE OF COPY 3.1 COPY FACTOR 64.5 2 DATE COPIED APRIL 1977

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7-12-60

FOR SOIL SURVEYS ONLY

DSA - 9AA - 48

48

KANE COUNTY S.S., UTAH

USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE

SCALE OF COPY 3.1 COPY FACTOR 64.5

SCALE 2.0 DATE COPIED APRIL 1977



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6-28-60

FOR SOIL SURVEYS ONLY

DSA-4 AA-53

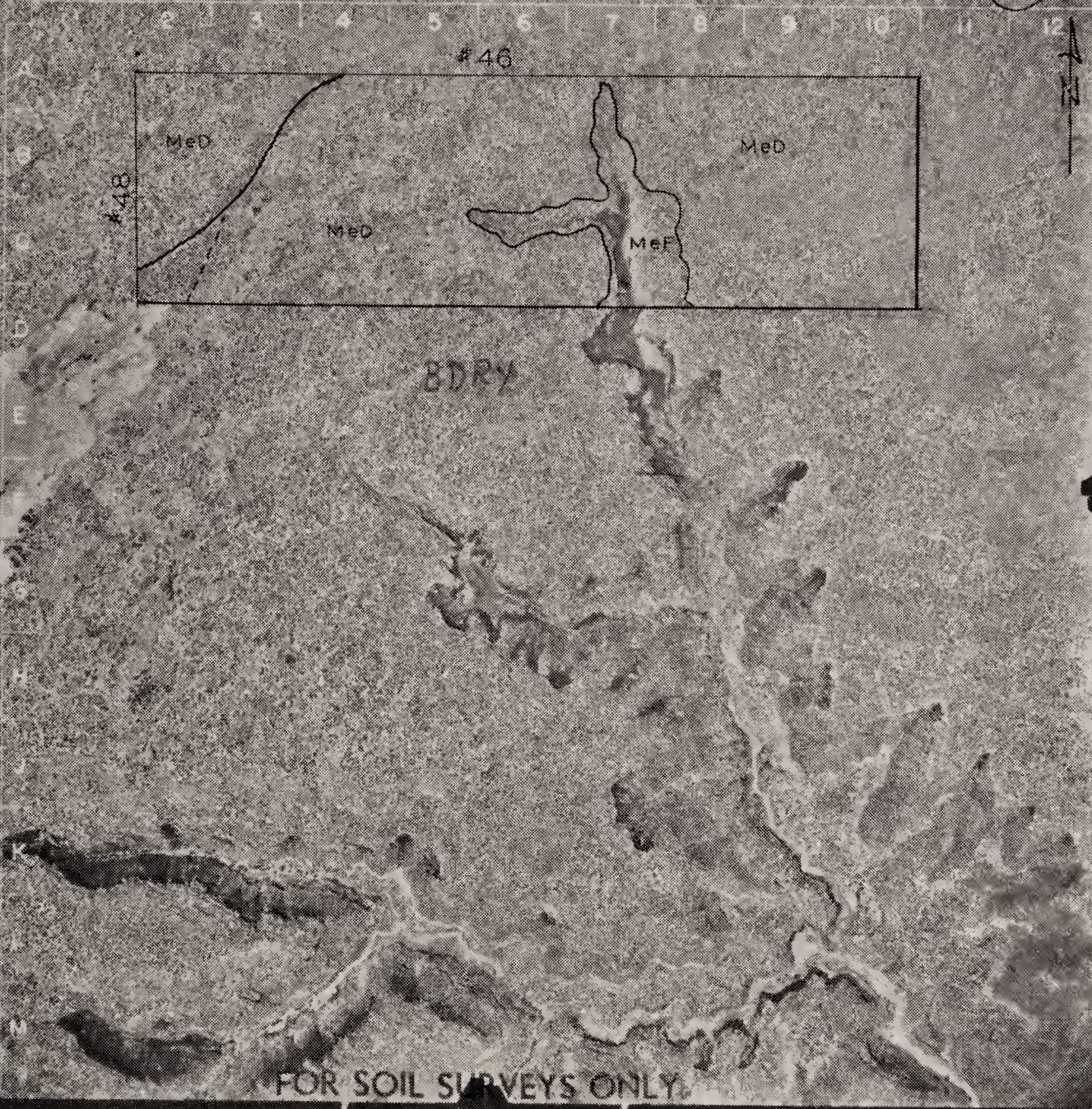
49

KADE COUNTY, S.S., OKLAH

USDA - SCS

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SCALE OF COPY 1:50,000 DATE OF COPY 1960



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6-25-60

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50

USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE  
KANE COUNTY S.S., UTAH  
SCALE OF COPY 3.1 COPY FACTOR 64.5 2  
DATE COPIED APRIL 1977  
SCALE 2.0



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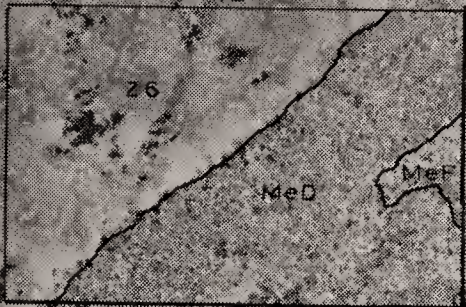


7-12-60

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DSA - 9AA - 46

(51)



BDRY

BDRY

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KANE COUNTY S.S. UTAH

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DSA-2 AA-65

52



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KANE COUNTY S.S., UTAH

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DSA-2 AA-137

53



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KANE COUNTY S.S., UTAH

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DSA - 1AA-6

(54)



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KANE COUNTY S.S., UTAH

0 1 MILE

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DSA-1 AA-78

55



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KANE COUNTY S.S., UTAH

SCALE OF COPY 3.1 COPY FACTOR 64.5

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DSA-1 AA-100

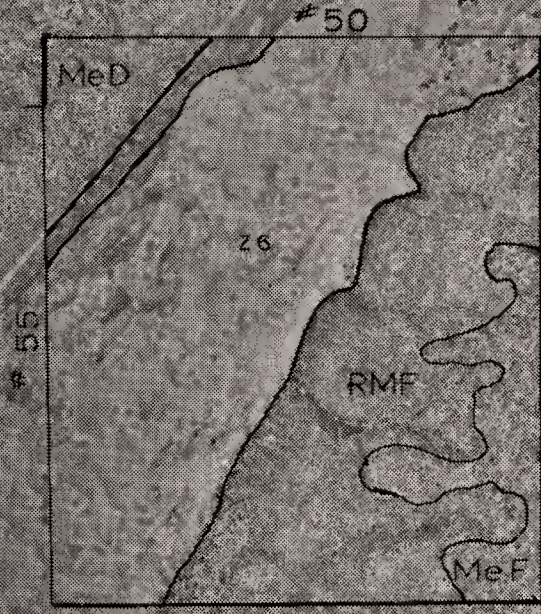
56

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KANE COUNTY S.S., UTAH

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DATE COPIED APRIL 1977  
SCALE 2.0  
COPY FACTOR 44.5  
SCALE OF COPY 3.1



FOR SOIL SURVEYS ONLY



4-14-66

FOR SOIL SURVEYS ONLY

AS 39-5

57



MOHAVE COUNTY S.S. ARIZONA

USDA - SCS

ADVANCE COPY - SUBJECT TO CHANGE

SCALE OF COPY 3.1

COPY FACTOR 64.5

SHEET 20 DATE COMPILED APRIL 1977



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4-14-66

FOR SOIL SURVEYS ONLY

AS 40-6

58

SCALE OF COPY 3.1

COPY FACTOR 64.5

SCALE 2.0

DATE COPIED APRIL 1971

MOHAVE COUNTY S.S., ARIZONA

USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE



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41-583



4-15-66

FOR SOIL SURVEYS ONLY

AS 41-7

59

MOHAVE COUNTY S.S., ARIZONA

USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE

SCALE OF COPY 3:1

COPY FACTOR 64.5

SCALE 2:0

DATE COPIED APRIL 1977



FOR SOIL SURVEYS ONLY

41-583







4-15-66

FOR SOIL SURVEYS ONLY

AS 42-7  
REGISTERED

(61)



MOHAVE COUNTY S.S., ARIZONA

USDA - SCS ADVANCE COPY - SUBJECT TO CHANGE

SCALE OF COPY 3.1 COPY FACTOR 64.5

SCALE 2.0 DATE COPIED APRIL 1977

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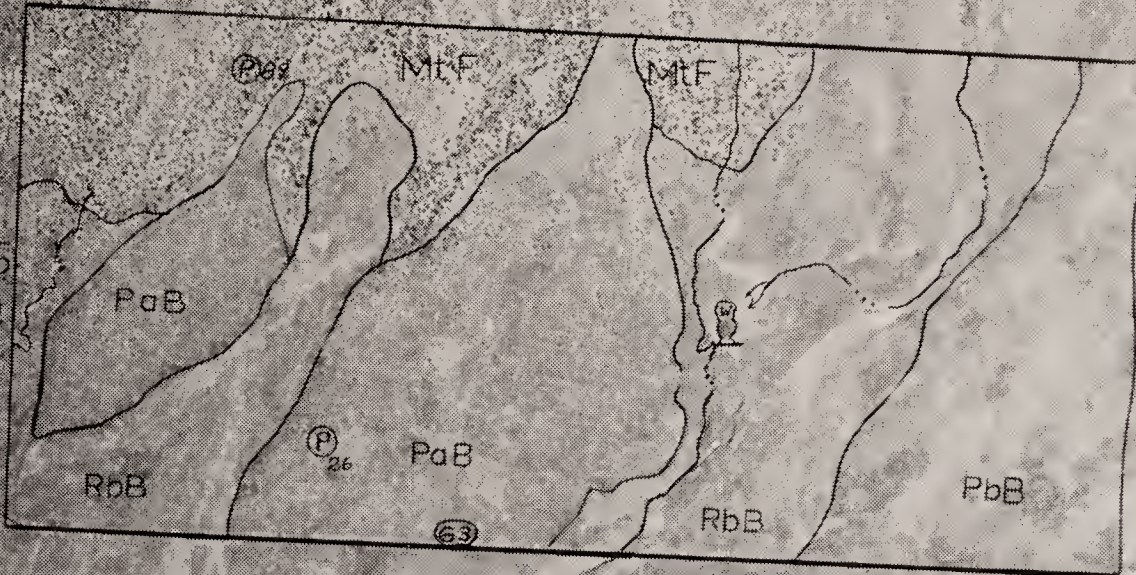


4-7-66

FOR SOIL SURVEYS ONLY

AS 43-8

62



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MOHAVE COUNTY S.S., ARIZONA



SCALE OF COPY 3.1 COPY FACTOR 64.5 SCALE 2.0 DATE COPIED APRIL 1977

66-12-07



4-14-66

AS 44A-8

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63

MOHAVE COUNTY S.S., ARIZONA

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4-14-66

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AB 351-10

64



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MONROE COUNTY S.S. ARIZONA  
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65

5A-9

MOHAVE COUNTY S.S., ARIZONA

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66

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WANE COUNTY S.S., UTAH

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